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CHAPTER I

Infantry in Battle

STUDIES IN INFANTRY TACTICS AS ILLUSTRATED BY INCIDENTS FROM THE WORLD WAR

NIGHT ATTACKS

Success in a night attack depends upon direction, control, and surprise.

The most careful preparation is essential. A thousand and one contingencies that an attack by night gives rise to, must be foreseen and provided for. Especially must meticulous provision be made for maintaining direction, for preserving control, and for insuring the utmost secrecy until the attack is within assaulting distance.

Owing to the power of modern armament, night attacks will probably be more frequent in future conflicts. Positions which infantry has failed to take by day may sometimes be successfully stormed by night. Particularly will darkness aid in the passage of areas that enemy fire denies by day. They seem to offer a solution to the problem of how to get attacking troops forward without the heavy losses incident to a daylight advance against an enemy in position.

Night attacks have their place but they are by no means a panacea for avoiding the difficulties of modern combat. They present many difficulties all their own. Imperfectly-trained and partially-disciplined troops will seldom succeed in these operations. Even seasoned veterans, led by experienced commanders, have often failed dismally to overcome the dangers of the dark.

EXAMPLE I

In 1914, during the first days of the Battle of the Marne, the German Fifth Army suffered so heavily from French artillery fire that the infantry was unable to close with the enemy. In order to come to grips, the army ordered an attack for the night of the 9/10 of

September on a front of 20 kilometers. Portions of four army corps participated. One of the units engaged in this action was the 30th Infantry of the 34th German Division.

On September 9 this regiment, which had just received a number of replacements, was in reserve near Bulainville. (Figure 1). That afternoon the colonel received the division attack order. In this order the 30th Infantry was directed to launch its attack from the vicinity of Amblaincourt, which was believed to be occupied by the French. The small hill about 1800 meters southwest of Issoncourt was assigned as the regimental objective.

Realizing that the Bunet stream would have to be crossed, the colonel promptly dispatched an officer's patrol to reconnoiter for crossings. Before dark this patrol returned with the necessary information.

At nightfall the regimental commander assembled his officers and issued his order. The regiment would attack with the 2d and 3d Battalions abreast, the 2d on the right. The 1st Battalion would be in reserve. The 2d Battalion was to move forward along the west edge of the Chanel Wood and then turn eastward following the south edge toward the objective. The 3d Battalion would move on the objective by guiding on the north edge of the wood. Weapons would not be loaded and there would be no firing. Silence was mandatory. What commands had to be given would be transmitted in whispers. The progression of first-line battalions would be made "with units well in hand, preceded by a thick line of skirmishers."

By midnight the 30th Infantry and adjacent troops had reached attack positions north and west of Amblaincourt without alarming the French. Rain was falling.

The advance was started. As the leading elements neared Amblaincourt there was a sudden burst of firing. Immediately every one rushed toward the town. There were no French there. In the confusion some straw piles nearby caught fire, revealing the milling Germans to the French who actually occupied the Chanel Wood and who promptly opened a heavy fire. The German as-

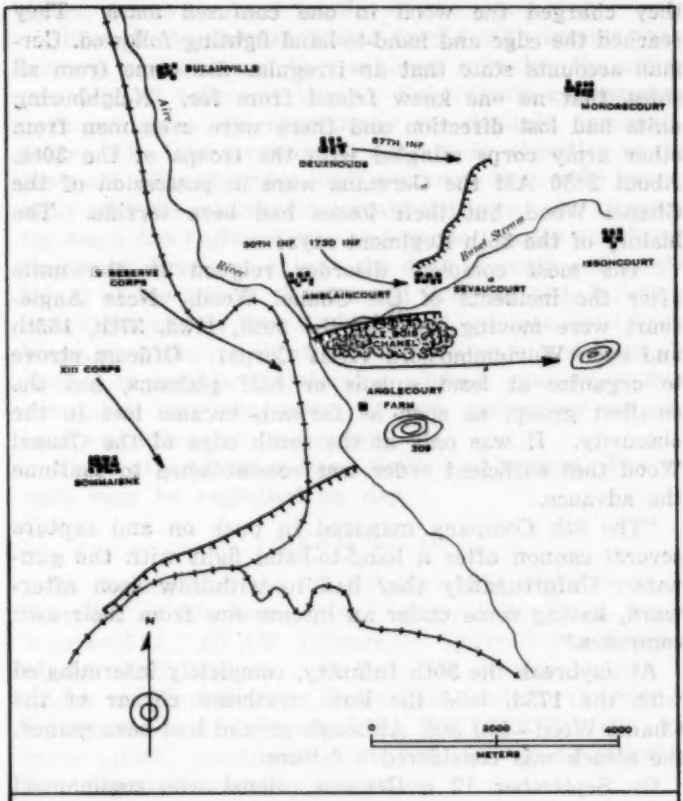


FIGURE 1

saulting units forthwith fell into the greatest disorder, and the 30th Infantry became intermingled with the 173d on its left.

In spite of the confusion and the heavy fire, most of the men of the 30th and some of the 173d, pushed on toward the dark outline of Chanel Wood. They crossed the Bunet Stream, the water reaching to their breasts and sometimes to their necks. Emerging from the stream

they charged the wood in one confused mass. They reached the edge and hand-to-hand fighting followed. German accounts state that an irregular fire came from all sides, that no one knew friend from foe. Neighboring units had lost direction and there were even men from other army corps mingled with the troops of the 30th. About 2:30 AM the Germans were in possession of the Chanel Wood, but their losses had been terrific. The history of the 30th Regiment says:

"The most complete disorder reigned in the units after the incidents of the Chanel Wood. Near Anglecourt were moving units of the 30th, 173d, 37th, 155th and even Wurtemburgers (XIII Corps). Officers strove to organize at least squads or half platoons, but the smallest group, as soon as formed, became lost in the obscurity. It was only at the south edge of the Chanel Wood that sufficient order was reestablished to continue the advance.

"The 8th Company managed to push on and capture several cannon after a hand-to-hand fight with the gunners. Unfortunately they had to withdraw soon afterward, having come under an intense fire from their own comrades."

At daybreak the 30th Infantry, completely intermingled with the 173d, held the line: northeast corner of the Chanel Wood—hill 309. Although ground had been gained, the attack was considered a failure.

On September 12 a German colonel who commanded a unit in the same division with the 30th, met the German Crown Prince, who commanded the Fifth Army, and asked permission to speak frankly regarding this attack. This being granted he said:

"Imperial Highness, one more night attack like that one and the army will be forever demoralized."

(From the article in the Revue D'Infanterie, August, 1927, by Colonel Etienne, French Army.)

DISCUSSION

The history of the 30th Infantry refers to this night as "St. Bartholomew's Eve." In the memory of the sur-

vivors, it was the most terrible of the entire war.

Although the German troops fought with incontestable bravery, and although they achieved miracles, the action was doomed before it began. Subordinate commanders were not given the opportunity for daylight reconnaissance. The infantry was not opposite its objective at the jump-off. The objective itself was more than 6000 meters away with the intervening terrain unknown. As a crowning touch the regiment was ordered to execute an abrupt change of direction—this in the dead of night and at the height of the attack. To demand that the 30th Infantry, in a night attack, take Amblaincourt, capture the Chanel Wood, then change direction and push on to a distant objective, meanwhile maintaining control, was more than demanding the impossible; it was presenting an unequivocal invitation to disaster.

Night attacks must have limited objectives. The results may be exploited by day.

EXAMPLE II

On the night of the 6/7 October, 1914, the French 2d Battalion of Chasseurs moved by truck to Vrely, where it arrived at 7:00 AM. (Figure 2). There it was attached to the 138th Brigade. At 2:30 PM it was ordered to march via Warvilliers on Rouvroy-en-Sauterre in order to participate in a night attack by the 138th Brigade. Another attack, coordinated with this, was to be launched from Bouchoir toward Le Quesnoy.

The 138th Brigade planned to attack with the 254th Infantry on the right, the 2d Chasseurs on the left and the 251st Infantry in reserve. The dirt road between Rouvroy and hill 101 was designated as the boundary between the 254th and the 2d Battalion of Chasseurs. The terrain between Rouvroy and Parvillers was flat and presented no difficulty to movement at night.

The 2d Chasseurs was an elite organization. However, as a result of previous fighting, it was reduced to an effective strength of approximately 150 men per company. Most of the battalion's six companies were commanded by noncommissioned officers.

At 5:45 PM, with dark closing in, the battalion moved forward through Rouvroy. Not more than an hour had been available for reconnaissance. Information was vague. It was believed that Parvillers was held by the Germans.

The 2d Chasseurs formed for attack as follows: Two companies were deployed in one long line of skirmishers, preceded by patrols. Four companies followed in second line. These four companies were abreast, each having two platoons leading and two following. Platoons were deployed in line of skirmishers. The distances ordered were:

150 yards from the patrol to the first line
200 yards from the first line to the second line
50 yards between leading elements of second-line companies and their supports.

The machine-gun platoon was placed 50 yards behind the left of the third line.

Shortly after dark the battalion advanced on Parvillers. As the advance neared hill 101, one of the patrols ran into an enemy outguard which promptly opened fire. Many of the French answered this fire without knowing what they were shooting at or why. Soon firing became general.

The two leading compaines halted. A cry of "Forward" ringing through the darkness was caught up and echoed by hundreds of voices. Abruptly the second-line companies rushed forward, racing toward Parvillers. Pell-mell, they charged through the leading companies, one of which followed. A terrific uproar ensued, punctuated with shouting and cheering.

The rush reached a trench 250 yards northwest of Parvillers. The defenders had fled, leaving weapons and equipment, but the enemy farther in rear had been warned. Suddenly three 77-mm cannon, 150 yards behind the trench, opened at point-blank range on the French. By the flashes artillerymen could be seen serving the guns. The French in front of the battery stopped, but those on the right closed in and captured the three pieces.

In great disorder the advance continued toward the

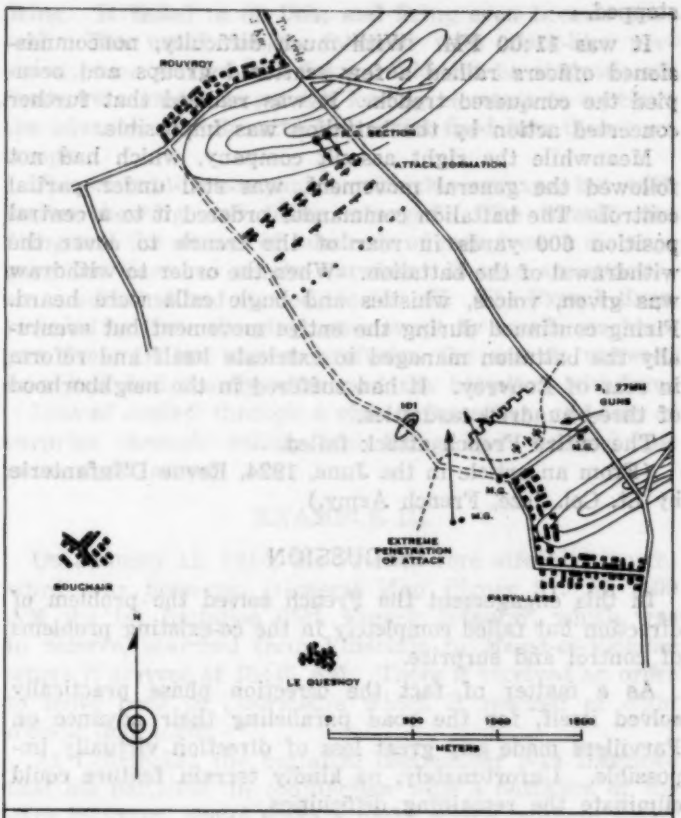


FIGURE 2

village. As they moved forward their left flank came under fire of hostile machine guns located on the road 600 meters northeast of Parvillers. By this time all French units were hopelessly intermingled, many company and platoon commanders had become casualties and in many places, confused by the dark, the French were firing on their own troops. The attack wavered and

stopped.

It was 11:00 PM. With much difficulty, noncommissioned officers rallied a few scattered groups and occupied the conquered trench. It was realized that further concerted action by the battalion was impossible.

Meanwhile the right assault company, which had not followed the general movement, was still under partial control. The battalion commander ordered it to a central position 600 yards in rear of the trench to cover the withdrawal of the battalion. When the order to withdraw was given, voices, whistles and bugle calls were heard. Firing continued during the entire movement but eventually the battalion managed to extricate itself and reform in rear of Rouvroy. It had suffered in the neighborhood of three hundred casualties.

The entire French attack failed.

(From an article in the June, 1924, Revue D'Infanterie by Lt. Col. Jeze, French Army.)

DISCUSSION

In this engagement the French solved the problem of direction but failed completely in the co-existing problems of control and surprise.

As a matter of fact the direction phase practically solved itself, for the road paralleling their advance on Parvillers made any great loss of direction virtually impossible. Unfortunately, no kindly terrain feature could eliminate the remaining difficulties.

It was inevitable that the widely scattered formation they adopted should result in loss of control. At night, distances and intervals must be diminished and formations kept compact. In this instance section columns or even larger groupings would unquestionably have gone a long way toward keeping the battalion in hand. Particularly was a compact formation mandatory here where most of the company and platoon leaders were noncommissioned officers with little or no experience.

The patrol which encountered the hostile outguard on hill 101 should have closed with the bayonet without

firing. It failed to do this, and firing soon became general. The usual results followed with clock-like precision; once started, the firing could not be stopped; officers were unable to get the leading elements to continue the advance, and the attacking units fired into their own troops.

The second-line companies, with due courage, but with undue cheering and firing, charged. The tumult, the firing and the onrush of hundreds of men from a distance gave the Germans ample warning. It was an attack—an assault that had started too far off. The French lines, revealed by their cheering, were swept by hostile machine-gun fire. In the utmost confusion the assault wavered to a halt and shortly afterward the battalion withdrew.

Loss of control through a vicious formation, and loss of surprise through yelling and firing had wrecked one more night attack.

EXAMPLE III

On January 12, 1915, the French were attacking northward near Soissons. (General Map Figure 3). At 7:00 AM the 1st Battalion 60th French Infantry, which was in reserve, marched from Villeblain to Maast-et-Violaine where it arrived at 10:45 AM. There it received an order to move back to Courmelles which it reached at eight o'clock that night

At Courmelles the battalion commander was informed that his battalion, in conjunction with a battalion of the 44th Infantry, would make a night attack, without delay, to retake hill 132 which had just been captured by the Germans.

No large-scale maps were available, no one in the battalion knew the terrain, and there was no information as to the exact location of the hostile positions. The order received by the battalion commander more than met the requirement of brevity—"attack when you get close to hill 132." The information he received was equally helpful: "The enemy is on hill 132. He will shoot at you." A guide had been provided, however, to conduct the battalion to the French front line.

The two battalions cleared Courmelles at 8:30 PM and arrived at the Vauxrot Glass Factory two hours later, where they dropped packs. They now marched along the road in single file. At Point A (Special Map, Figure 3) the guide turned off into a communication trench that was knee-deep in mud and blocked in several places by fallen trees. At these blocks the column was broken, companies became disorganized and considerable time had to be spent in reorganizing platoons when the front line was reached. As a result it was 3:30 AM before the attack formation could be taken.

The battalion was directed to form with two companies in assault and two in support, each company in column of platoons, and each platoon deployed in line of skirmishers. On forming up, company commanders found that they had near them only squads without leaders and portions of platoons. Entire units were missing. Someone lit a match to check the compass. German flares became increasingly frequent.

At 4:00 AM the attack jumped off—but in places only. The troops were poorly oriented. They did not know where to go or where to stop. There was no liaison. One assault company lost direction. The company behind it pushed on and the two became hopelessly intermingled. German artillery and machine guns opened a withering fire on the disorganized units, forcing them to halt, take cover and wait for daylight.

At daybreak it was learned that the battalion of the 44th had attacked on the right of the 60th at a slightly later hour. Both battalions had failed, virtually no ground having been gained. The losses in the 60th were exceptionally heavy.

(From the article in the June, 1924, Revue D'Infanterie, by Lt. Col. Jeze, French Army.)

DISCUSSION

This attack is a conspicuous tragedy of error. A deliberate effort at failure could not have been more thorough.

The troops were exhausted when the attack was launch-

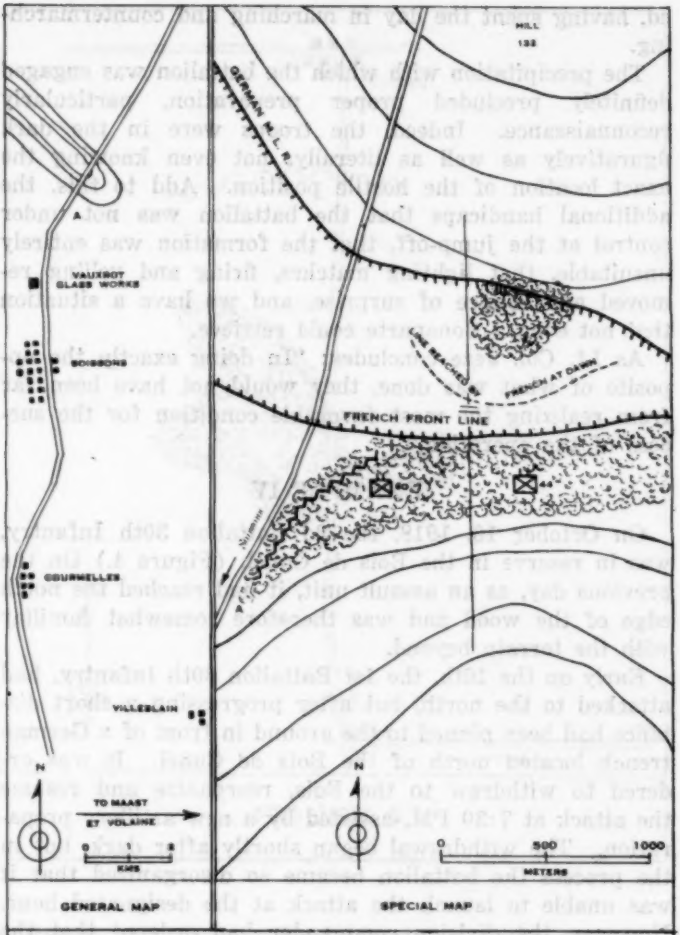

VAUXROT GLASS WORKS
BOISSONS
COURMELLES
VILLERLAIN
TO MAAST ET VOLAINE
KMS
GENERAL MAP
GERMAN M. L. R.
HILL 132
LINE REACHED BY FRENCH AT DAWN
FRENCH FRONT LINE
Stream
METERS
SPECIAL MAP

FIGURE 3

ed, having spent the day in marching and countermarching.

The precipitation with which the battalion was engaged definitely precluded proper preparation, particularly reconnaissance. Indeed, the troops were in the dark figuratively as well as literally, not even knowing the exact location of the hostile position. Add to this, the additional handicaps that the battalion was not under control at the jump-off, that the formation was entirely unsuitable, that lighting matches, firing and yelling removed any chance of surprise, and we have a situation that not even a Bonaparte could retrieve.

As Lt. Col. Jeze concludes: "In doing exactly the opposite of what was done, they would not have been far from realizing the most favorable condition for the success of the operation."

EXAMPLE IV

On October 10, 1918, the 2d Battalion 30th Infantry, was in reserve in the Bois de Cunel. (Figure 4.) On the previous day, as an assault unit, it had reached the north edge of the wood and was therefore somewhat familiar with the terrain beyond.

Early on the 10th, the 1st Battalion 30th Infantry, had attacked to the north, but after progressing a short distance had been pinned to the ground in front of a German trench located north of the Bois de Cunel. It was ordered to withdraw to the Bois, reorganize and resume the attack at 7:30 PM, assisted by a new artillery preparation. The withdrawal began shortly after dark, but in the process the battalion became so disorganized that it was unable to launch the attack at the designated hour. However, the division commander had ordered that the trench 800 yards north of the Bois de Cunel be taken on the 10th. Since the 1st Battalion had failed to accomplish this mission and was unable to make a second effort in time, the 2d Battalion 30th Infantry and one company of the 7th Infantry were directed to attack the hostile position at 10:00 PM. The northwestern edge of the wood was designated as the line of departure for the 2d

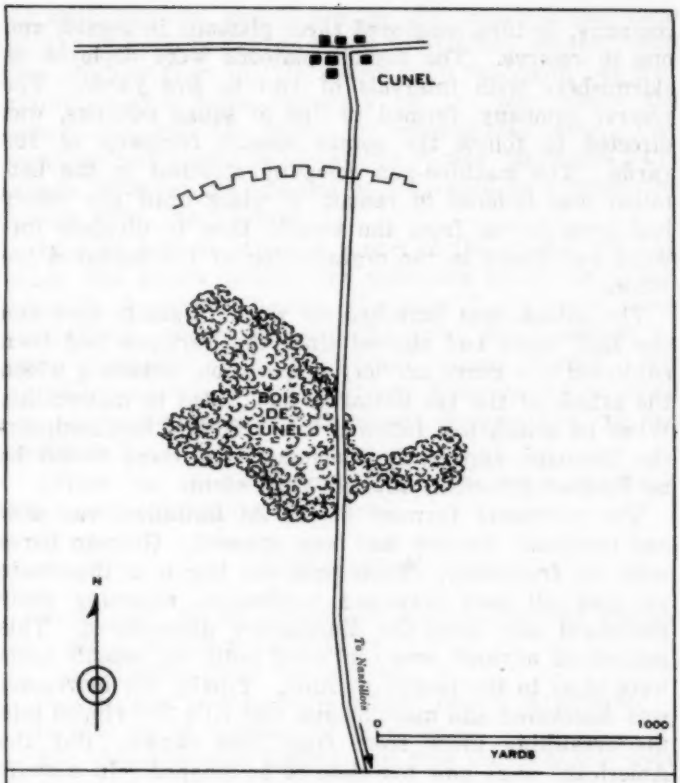


FIGURE 4

Battalion and the northeastern edge for the company. There was to be no artillery support.

After all units were in place the battalion commander assembled his company commanders and thoroughly explained the details of the attack. The formation was three companies in assault and one in reserve. As the frontage was large and since all organizations had been depleted some forty per cent in previous fighting, each

company, in turn, employed three platoons in assault and one in reserve. The assault platoons were deployed as skirmishers with intervals of two to five yards. The reserve company, formed in line of squad columns, was directed to follow the center assault company at 100 yards. The machine-gun company attached to the battalion was ordered to remain in place until the enemy had been driven from the trench, then to displace forward and assist in the organization of the captured position.

The attack was launched on time. Exactly two and one half hours had elapsed since the Germans had been subjected to a heavy artillery preparation, following which the attack of the 1st Battalion had failed to materialize. When no attack had followed this 7:30 PM bombardment the Germans apparently concluded that there would be no further American advance that night.

The movement forward of the 2d Battalion was slow and cautious. Secrecy had been stressed. German flares went up frequently. Each time one began to illuminate an area all men remained motionless, resuming their movement only when the illumination disappeared. This method of advance was continued until the assault units were close to the hostile position. Finally the movement was discovered and machine-gun and rifle fire ripped into the assaulting units from front and flanks. But the Americans were now too close to be stopped. In a swift charge they closed with the enemy, overcame a determined resistance and captured part of the disputed trench. The Germans, however, were still holding portions of the trench on the flanks.

By this time every vestige of organization had disappeared. Many company, platoon and section leaders were casualties. The reserve company was completely intermingled with the assault companies. All was confusion. Immediate steps were taken to reorganize the battalion, while a message requesting reinforcements was sent to the regimental commander.

At 2:30 AM the battalion commander reported to the regimental CP. There he informed the colonel that the

2d Battalion was now occupying the trench in the zone of the 30th Infantry and had established contact with the company from the 7th Infantry on the right, but that reinforcements were necessary on the left where the enemy still held the trench in considerable force. One company was promptly dispatched to this dangerous flank where, after severe fighting, it succeeded in driving the enemy from his position.

At 6:00 AM the strength report of the troops that had made this attack showed the following effectives: Company E—1 officer, 30 men; Company F—40 men; Company G—1 officer, 20 men; Company H—1 officer, 27 men; Company G 7th Infantry—1 officer, 10 men. Not all of the missing were casualties. Many men who could not be accounted for had merely become lost in the darkness.

(From the personal experience monograph of Major Turner M. Chambliss, Infantry.)

DISCUSSION

Here most of the conditions essential to the success of a night operation are evident.

The battalion knew the terrain.

It was close to its clearly-defined line of departure.

It was placed opposite its objective.

The objective was limited and was unmistakable even in the dark.

The troops had not been engaged during the day and were therefore comparatively fresh.

Details of the attack were carefully explained by the battalion commander.

The movement was made in silence, great care being taken to avoid alarming the enemy.

The attack was made at a time when the Germans had concluded that no further effort would be made that night.

All of these factors made for success.

On the other hand the extended formation contributed to the loss of control, and the subsequent confusion and

intermingling of the reserve company with the assault units necessitated a call for help to clear up the situation on the left flank.

The figures giving the effective strength of units are indications of the disorder which may attend even a successful night attack. True the companies were depleted at the start but, even so, the small effective strength at the conclusion of the operation is striking.

EXAMPLE V

On November 5, 1918, the 123d French Division was attacking to the east. Late in the afternoon it had been stopped west of Esqueheries. The troops were almost exhausted but despite this the 12th Infantry with the 1st Battalion 6th Infantry attached, was directed to prepare an attack to take Esqueheries without delay. (Figure 5.)

The colonel of the 12th Infantry issued orders for an attack at dark. The 2d Battalion 12th Infantry, was directed to attack the town from the west, encircle it on the north and seize the exits toward Petit Foucomme and La Voirie. The 3d Battalion 12th Infantry, was ordered to pass north of the 2d Battalion and hold the exits leading toward RJ 191 and Le Nouvion. The 1st Battalion 12th Infantry was told to push forward to the Le Nouvion Road and occupy a position where this road entered the forest. The 1st Battalion 6th Infantry was directed to seize the southern exits of Esqueheries and those leading toward Sarrois. After securing these exits the attacking battalions were then to strike toward the center of the town.

The commander of the 1st Battalion 12th Infantry received this order at 8:00 PM and immediately sent for his company commanders. At 9:00 PM none of them had yet reached the battalion CP. In the interim the battalion commander learned that the 1st Battalion 411th Infantry, on his left, had received no order to attack. The night was pitch dark and rain was falling in torrents. There was no road or trail which could guide him to his objective; he would have to advance three

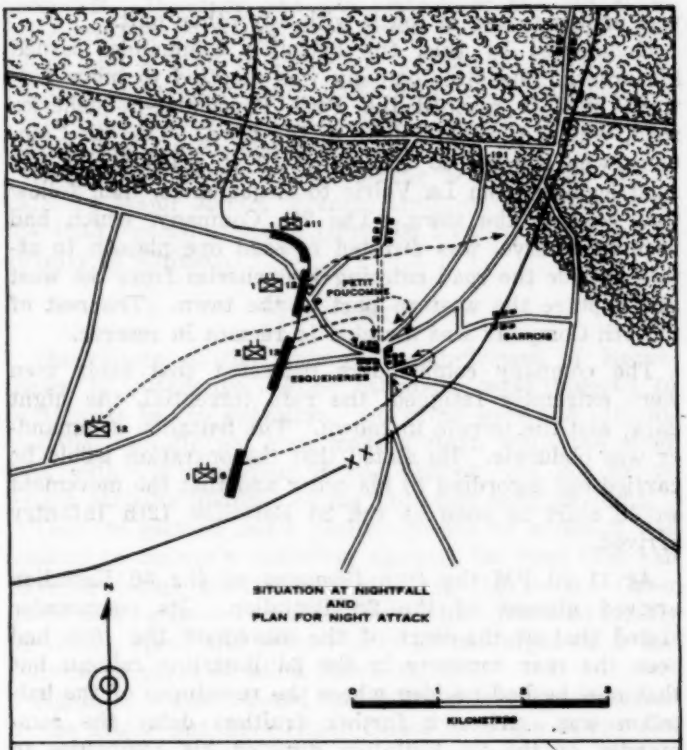


FIGURE 5

kilometers across country over terrain that bristled with thick hedges. Considering his men incapable of such an effort, he requested authority to remain in position until daybreak. This was granted.

The 2d Battalion 12th Infantry, also received this order about 8:00 PM. Its commander at once endeavored to get in touch with adjacent battalions to arrange details. He was finally informed that the 1st Battalion had received authority to delay its advance until daylight. He

was unable to get in touch with any other unit.

Undeterred by this, the battalion commander issued his order. The 5th Company was directed to move forward until it reached the Petit Foucomme-Esqueheries road, which it would follow to the town. The 6th Company was ordered to advance until it reached the dirt road leading from La Voirie to Esqueheries, then follow that road to the town. The 7th Company, which had been in reserve, was directed to send one platoon to attack astride the road entering Esqueheries from the west and capture the western part of the town. The rest of the 7th Company was directed to remain in reserve.

The company commanders protested that their men were extremely fatigued, the rain torrential, the night dark, and the terrain unknown. The battalion commander was obdurate. He stated that the operation would be carried out according to his order and that the movement would start as soon as the 3d Battalion 12th Infantry arrived.

At 11:00 PM the 10th Company of the 3d Battalion arrived abreast of the 2d Battalion. Its commander stated that at the start of the movement the 10th had been the rear company in the 3d Battalion column but that now he had no idea where the remainder of the battalion was. After a further fruitless delay the commander of the 2d Battalion directed his companies to move to the attack without waiting for the 3d Battalion.

Shortly after the attack jumped off, the remaining units of the 3d Battalion arrived. The men were exhausted, the companies disorganized and the officers unoriented. The battalion commander thereupon decided to remain in position until dawn.

Meanwhile the 2d Battalion had moved out at 1:00 AM, much later than had been expected. Darkness and the heavy rain made the forward movement slow and difficult. The 5th and 6th Companies did not reach the north edge of the town until daylight. Similarly the 1st Battalion 6th Infantry did not reach the southern exits until

5:00 AM. However, the one platoon of the 7th Company ordered to attack Esqueheries from the west and which had a road to guide on, progressed rapidly. It captured the western part of Esqueheries, whereupon the Germans evacuated the entire town, leaving this one platoon in undisputed possession.

(From the article in the Revue D'Infanterie, April, 1918, by Major Jaunet, French Army, on the advance of the 123d French Division from the Sambre Canal to the vicinity of Chimay.)

DISCUSSION

The failure of the attempted encirclement of Esqueheries is instructive. Four battalions were ordered to participate in the operation. So great were the difficulties that two did not even make a start, while the other two, with the exception of one platoon, did not arrive within striking distance of the objective until daylight.

This one platoon had a positive means by which it was enabled to maintain direction, namely, the road that ran past its initial position straight into the town. Other units, lacking points on their route which could be readily identified, spent the greater part of the night in a disheartening game of Blind Man's Buff.

Again it is pointed out, that of four battalions ordered to the attack but one platoon closed with the enemy and yet this single platoon was entirely successful in capturing the objective.

This operation graphically demonstrates the following facts: troops who are to take part in a night attack should be familiar with the terrain; the ground should not present too many obstacles to movement; the troops should be close to and opposite their objective; the axis of advance should be clearly marked and unmistakable; and finally the troops involved should be in good physical condition and imbued with a high morale.

EXAMPLE VI

On November 11, 1914, the 121st French Infantry was

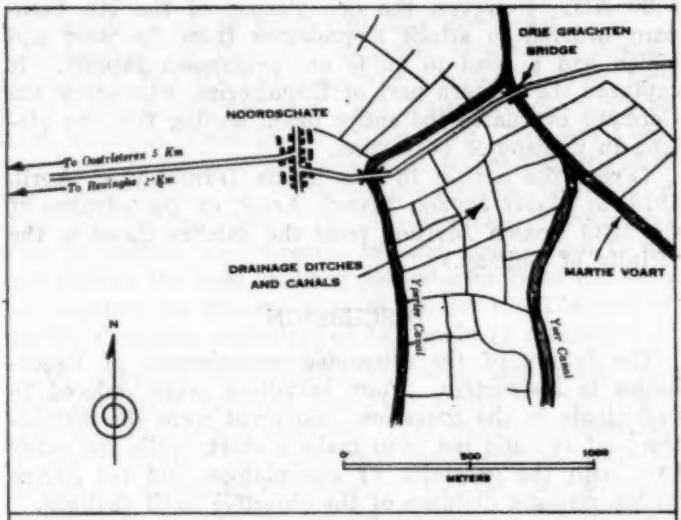


FIGURE 6

entrucked and moved to the north where a great battle was in progress along the Yser River.

In three months of war the 121st had been both lucky and successful. Morale was excellent. As an added touch, many officers and noncommissioned officers, wounded in earlier fights, had recently returned to the regiment.

About noon the 121st arrived at Oostvleteren. (Figure 6.) Here it was directed to march to Reninghe where further orders would be issued.

At Reninghe at 4:00 PM a division commander informed the colonel:

"Your regiment is attached to my division. The Germans have crossed the Yser Canal between the Drie Grachten bridge and a point 800 meters south of it. There is nothing in front of Noordschote to prevent their rapid progress toward Reninghe.

"At 1:00 AM tonight the 121st will attack and drive the enemy over the Yser.

"The XX Corps will be on your right and a regiment of Zouaves on your left. There is a gap between them. Their flanks are near the canal.

"You will find the Colonel of Zouaves at Noordschote.

"Carry on without further orders."

The regimental commander designated the 2d Battalion, supported by a machine-gun platoon, to make the attack.

Noting from his map that the terrain between the Yser and Yperlee Canals appeared extremely difficult, the battalion commander determined to make a personal reconnaissance. Saddle horses having just arrived he mounted all his company commanders and moved rapidly toward Noordschote. Finding no one there the party climbed to the second story of a house and studied the terrain. Although dusk was closing in, sufficient light remained to show that the problem of reaching the Yser with troops at night would present grave difficulties. The intervening terrain was a quagmire, interlaced with small canals and large ditches, which would obviously make the maintenance of direction and control extremely difficult. No French units could be seen. Apparently there were some Germans near the Yser Canal.

Following the reconnaissance, the battalion commander issued an oral order for the attack. He directed the battalion to move forward without delay to Noordschote and to form by 11:30 PM along the Yperlee Canal with three companies abreast, their right 400 meters south of the Noordschote Bridge, and their left just north of the Yperlee bend. Patrols would be sent out to seek liaison with units on the flanks. Reconnaissance of the canals directly to the front was limited to 200 yards in order not to alarm the enemy. Two companies were directed to search Noordschote for light material such as ladders and planks which could help them cross canals.

At 12:15 AM the 8th Company would move out along the ditch 400 meters southeast of and parallel to the Noordschote—Drie Grachten road and follow this ditch to the Yser.

The 6th Company, starting at 12:30 AM, would at first follow the ditch just south of the road then incline to the right and march on the junction of the Yser and the Martie Vaart.

The 5th Company, at 12:40 AM, would follow the road or the ditch just north of the road and attack the Drie Grachten bridge.

The 7th Company and the machine guns were to remain east of Noordschote in reserve.

The battalion commander further directed that there be no firing, that leading elements wear a white brassard, and that particular attention be paid to control, each company moving in a single column, preceded by an officer's patrol.

About 6:30 PM the battalion started its march on Noordschote. In the meantime the battalion commander had reported the results of his reconnaissance and his plan for the attack to the regimental commander, who approved his dispositions but informed him that he was going to try to have the attack postponed 24 hours.

At 8:00 PM the battalion commander met the colonel of the Zouave regiment at Noordschote, which still appeared entirely deserted. The Zouave commander stated that he knew reinforcements were coming but not that a night attack was contemplated. He added that he could not furnish any guides who knew the terrain in question. There were no evidences of the XX Corps to the south.

The battalion reached Noordschote at 8:30 PM. Efforts to find the commander of the front-line battalion of Zouaves on the left failed. However, the few Zouaves in the vicinity were notified of the proposed action of the 121st and told not to fire. Likewise a few tired soldiers of another unit were found just north of the Noordschote —Drie Grachten road and their commander, a noncommissioned officer, was informed of the plan to attack. To questioning he replied that he knew nothing of the terrain south of the road but believed that the water in the ditches would be about a meter deep. At 11:00 PM patrols reported that water in these ditches was breast high.

Just at this time an order was received countermanding the attack and directing the battalion merely to hold its ground. All companies were immediately notified.

At 11:10 AM a patrol reported that it had gained contact with the XX Corps to the south and found it in a state of complete confusion; no one there knew the location of even the larger elements.

At 12:30 AM came a new counterorder directing the attack to be launched at 3:00 AM. The battalion maintained all its previous arrangements with the exception of the times at which companies were to move.

The 8th Company moved forward at 2:15 AM. At 2:30 AM the captain of this company reported that it was almost impossible to cross the canals. Several men had fallen in and were unable to climb out of the sticky mud. He added that under such conditions movement to the Yser would require several hours, that many men would be lost enroute and that there would be no surprise. Having implicit confidence in this company commander and feeling that he would not exaggerate difficulties, the battalion commander immediately ordered:

"The 8th Company will follow the 6th and on reaching the Yser, move south to its objective."

The 6th Company moved out on the Noordschote—Drie Grachten road and followed it almost to the Yser before turning south. A few minutes later the 8th Company followed the 6th. The 5th Company then moved by the same route to the Drie Grachten Bridge.

The attacks of all three companies succeeded.

The Germans, completely surprised, were thrown back over the Yser without more than a shot or two being fired. The battalion captured 25 prisoners and suffered no losses.

(From the article by Lt. Col. Baranger, French Army, in the Revue D'Infanterie, April, 1929.)

DISCUSSION

This attack succeeded despite conditions which might easily have led to failure, such as fatigue of the troops,

the almost impassable state of the ground, vagueness as to situation of adjacent units, and the fact that the troops arrived on the scene after dark.

Why did it succeed? DIRECTION! CONTROL! SURPRISE!

The column formation in which the advance was made facilitated control. Each company was preceded by an officer's patrol, thus, when contact was first made, it was made by a group under a responsible leader.

The road and the Yser guided the troops to their destination. In the original order these companies were to advance abreast, each in a column and each following a specified ditch. When this was found to be impracticable, all used the road.

Extreme precautions were taken to obtain surprise. Despite the obvious desirability of ascertaining the state of the terrain the battalion commander limited reconnaissance to 200 yards to the front in order to avoid alarming the enemy. In the advance he insisted on silence and prohibited firing.

Finally, the battalion consisted of good troops and determined leaders, and as a result of success in three months of war, a feeling of mutual trust and confidence had been established.

"The symphony in black was not known to this battalion," says Colonel Baranger.

CONCLUSION

Experience in the past has led to certain conclusions in regard to the undertaking and preparation of night attacks. Among many such conclusions are the following:

1. Night attacks should be undertaken preferably by troops that are fresh, well-trained, in good physical condition and who are under excellent control at the start.

2. The objective should be clearly defined and easily recognized in the dark, or already known to the attacking troops.

3. The units making the attack should be able to form facing the objective and at no great distance from it.

4. Generally speaking, there can be no maneuver. Each

attacking column must drive through to its objective without regard to the progress of adjacent units. (This does not preclude maneuver by very small groups, involving distances of only a few yards.)

5. Simplicity in night attacks is vital in order to maintain direction and control. Routes of approach should be clearly defined and unmistakable in the dark. Trails, railroads, edges of woods, ridges, valleys or other prominent features leading toward the objective which can be readily located and followed by the troops are most desirable.

6. Subordinate leaders should be afforded an opportunity for daylight reconnaissance.

7. Detailed preparation is usually necessary if the attack is to succeed.

For the troops who are to carry out the attack the following points are important:

1. The formation must facilitate the maintenance of direction and control. This means a column formation in the early states, and, as the enemy is approached, a line of small columns preceded by patrols, in preference to a line of skirmishers.

2. A strong leader with some determined men should be at the head of each column. A reliable character should be placed at the rear. Thus emergencies can be handled silently and decisively.

3. Instructions must be explicit. All men should know the objective, the compass direction of attack, the formation to be assumed at position of deployment, the exact mission of the unit, the signal for the final rush to the assault, action in case the enemy is not surprised, locations of rallying points in the event the attack is definitely checked, action upon capturing the hostile position, and the means of identifying friendly troops.

4. Secrecy and silence are essential. There must be no firing, no yelling, no smoking, no striking of matches. Absolute silence must be maintained until the troops are among the enemy.

Night attacks are highly difficult operations. They are frequently the expression of a vigorous leadership, which,

regardless of difficulties, is determined to carry through to a successful conclusion. But despite the vigor of leadership, these attacks will usually fail unless extreme attention be accorded that military trinity of the night—*direction, control, and surprise.*

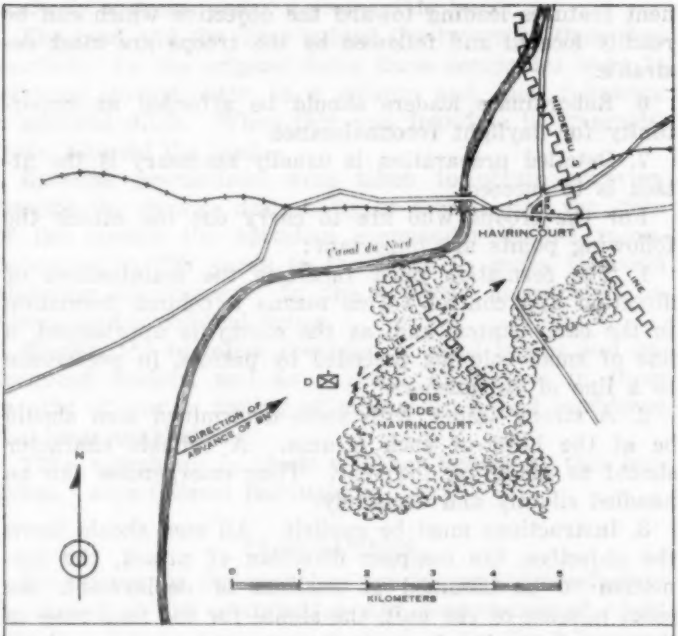


FIGURE 7

CHAPTER II

Infantry Problems

The following problems are based on World War incidents. Their object is to furnish material for instruction in battle tactics of small units.

The historical narrative is presented in the form of situations. At appropriate times a solution is called for in the form of a requirement. At these points it is hoped the reader will pause to formulate his own solution before continuing the account.

The actual historical solution, as nearly as it can be derived from the source, is given after each requirement. This may not have been the complete solution of the participant; it is merely what was recorded.

The comments on each solution are made in the light of our present-day doctrines and from the unquestioned vantage point of hindsight. There is no intent to criticize the participant, but merely to bring out the instructional points. We must bear in mind that unusual factors and accidents often caused theoretically faulty solutions to work; but the mere fact that they did work does not make them less faulty. We must also remember that the intimate knowledge of conditions and the impressions in the mind of the man actually on the ground had great weight in his decision and cannot be reproduced in problems written years afterwards.

PROBLEM NO. 1

A DAYLIGHT PATROL

In March, 1917, a battalion of British infantry took part in the pursuit that followed the German retirement to the Hindenburg Line. For several days the advance had been conducted under open warfare conditions. Even some friendly cavalry had been seen moving toward the front.

Just before dark one night this battalion halted near the edge of a large woods and dug in. (See Figure 7).

By dawn the battalion was in position, awaiting the first signs of activity by the invisible enemy who was hidden in the woods. The men could see that many trees in the woods had been recently felled for the leaves on the fallen trees were still green and fresh. The situation was tense but the morning wore on without incident.

About 9:00 AM the lieutenant commanding Company D received a message from the battalion commander to send out an officer's patrol to reconnoiter the woods. This message stated that information was required about the enemy line of defense in the woods and the state of the bridges over the Canal du Nord. The message specifically directed that the patrol gain contact with the enemy and obtain definite information of his whereabouts and numbers.

As this was a task requiring nerve and experience, the lieutenant chose an officer who had been in the lines for some time, on whom he felt that he could rely.

The patrol started off at 11:00 AM. The company commander was amazed to see the patrol disappear into the woods in a close column of files with the leader at the head. With deep misgivings, the company commander awaited its return.

About 1:00 o'clock, to his great relief, the patrol returned, still in the same formation, and its leader submitted a report. This report contained no precise information and was far from clear. Rather dubiously the company commander forwarded it to battalion headquarters.

Shortly afterward he was ordered to report to the battalion commander.

"Quite useless," said that officer, with regard to the report, "You will have to go yourself and do it again. I am, of course, sorry you should have to go, but it was your business to see that an officer was sent who was capable of doing the job. I want the report here by 6:00 PM at the latest."

DISCUSSION

The selection of patrol leaders is a most important factor. In this instance it was fairly obvious from the formation taken up that the leader had little knowledge of patrolling. The vague and unsatisfactory report turned in was no more than could be expected from a patrol leader not even familiar with the basic requirements for the conduct of a patrol. A patrol leader should be selected especially for his endurance, courage, good judgment, and knowledge of the technique of patrolling. A little checking up before the patrol left, such as asking the patrol leader what his plan was, would probably have eliminated this failure.

***SITUATION, CONTINUED.*—Somewhat chagrinned, the lieutenant returned from the battalion command post pondering the best method of organizing the patrol.**

***FIRST REQUIREMENT.*—Actions and orders of the patrol leader to cover personnel, strength, equipment and formation, prior to departure of the patrol.**

SOLUTION TO FIRST REQUIREMENT.—The lieutenant first selected the sergeant major as his second-in-command—a really old hand—a small rugged man with a big mustache and the heart of a lion. To the sergeant major he gave the following order: "Get hold of six good men. We have to take a patrol into the woods, which will take an hour or so. You will send two scouts out ahead, the second one to follow the first at fifty yards. You and I will follow fifty yards behind the second scout. The others will be in pairs, acting as flank guards, about 100 yards on each side of us. We start in half an hour. Carry as little as possible—just rifles and a bandoleer to each man."

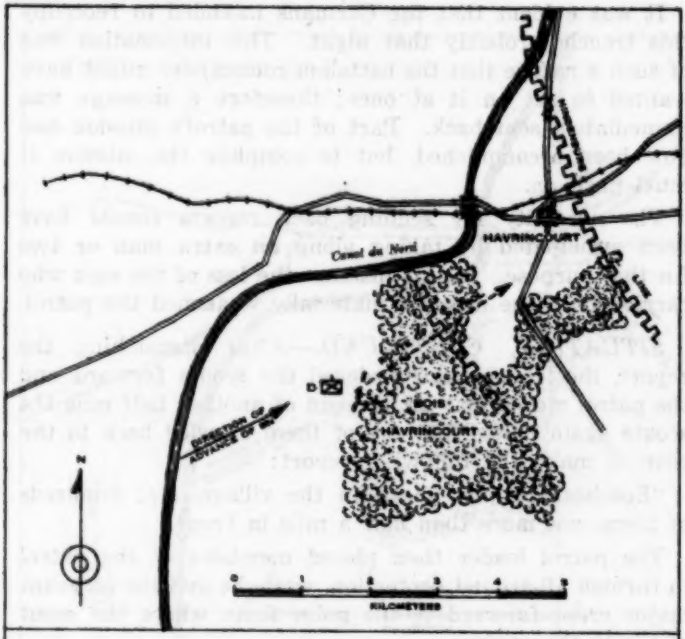
DISCUSSION

Analyzing this order we see that, in general, sound methods of patrolling were followed. The patrol leader called for selected men for his patrol; he used an open and inconspicuous formation well adapted to daylight patrolling; finally he prescribed arms and equipment suitable for this type of work. A daylight reconnaissance patrol must see and not be seen; its mission does not contemplate fighting, and it will have little use for arms other than rifles.

It is a well-founded principle that the formation of a patrol should, at all times, provide all-around observation and protection. In this respect the patrol leader should have provided for protection of the rear by using at least one man as a rear point and get-away man.

SITUATION, CONTINUED.—Progress was slow through the woods because of fallen timber. When the patrol had advanced about a half mile into the woods one of the scouts brought word that he could see a system of trenches to the front, protected by wire entanglements. Upon investigating, the patrol leader found a newly prepared trench, which, although unoccupied at the time, was in perfect order and completely equipped with arms, food, water and ammunition.

SECOND REQUIREMENT.—Action of patrol leader.


HAVRINCOURT
Canal du Nord
BOIS DE HAVRINCOURT
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0 1 2 3 4 5
KILOMETERS

FIGURE 7

SOLUTION TO SECOND REQUIREMENT.—The patrol leader made a sketch of the trench, showing its location in the woods, and sent it back with a report to his battalion commander. He then proceeded toward Havrincourt.

DISCUSSION

It was evident that the Germans intended to reoccupy this trench, probably that night. This information was of such a nature that the battalion commander might have wanted to act on it at once; therefore a message was immediately sent back. Part of the patrol's mission had now been accomplished, but to complete the mission it must push on.

The necessity for sending back reports should have been anticipated by taking along an extra man or two for that purpose. In this instance the loss of the man who carried back the message materially weakened the patrol.

SITUATION, CONTINUED.—After dispatching the report, the leader again ordered the scouts forward and the patrol moved on. At the end of another half mile the scouts again halted and one of them crawled back to the rear to make the following report:

"Bosches are just ahead in the village, sir; hundreds of them, not more than half a mile in front."

The patrol leader then placed members of the patrol to furnish all-around protection, while he and the sergeant major crept forward to the point from where the scout had seen the enemy.

The patrol leader saw to his right front the village of Havrincourt. On the left of the village was the Canal du Nord. The bridges over the canal had been destroyed. Beyond the village he saw a great system of trenches,—evidently the Hindenburg Line. German soldiers could be seen lying on the grass in the sun or moving about the village engaged in various jobs.

THIRD REQUIREMENT.—Action of the patrol leader.

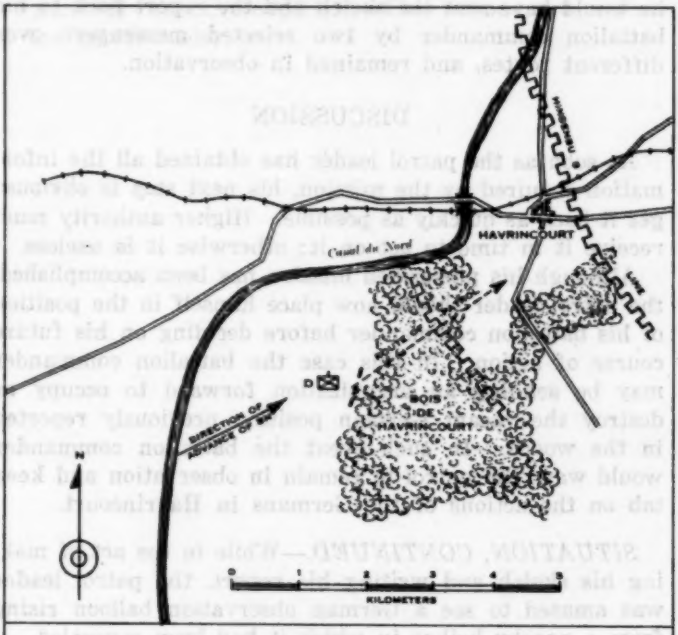

HAVRINCOURT
Canal du Nord
BOIS DE HAVRINCOURT
DIRECTION OF ADVANCE OF BN
N
KILOMETERS

FIGURE 7

SOLUTION OF THE THIRD REQUIREMENT.—The patrol leader made a rough sketch of the ground to the front, showing the location of the Hindenburg Line, the canal and the destroyed bridges. He also made brief notes containing an estimate of the number of Germans at Havrincourt. Here the patrol leader was interrupted by an unforeseen event; it is impossible to tell what other action he intended. However, it is logical to assume that he would have sent the sketch and the report back to his battalion commander by two selected messengers over different routes, and remained in observation.

DISCUSSION

As soon as the patrol leader has obtained all the information required by the mission, his next step is obvious: get it back as quickly as possible. Higher authority must receive it in time to act on it; otherwise it is useless.

Although his prescribed mission has been accomplished, the patrol leader should now place himself in the position of his battalion commander before deciding on his future course of action. In this case the battalion commander may be sending an organization forward to occupy or destroy the vacant German position previously reported in the woods. In such event the battalion commander would want the patrol to remain in observation and keep tab on the actions of the Germans in Havrincourt.

SITUATION, CONTINUED.—While in the act of making his sketch and writing his report, the patrol leader was amazed to see a German observation balloon rising from a nearby hollow in which it had been concealed.

The balloon rose slowly and swung to a position almost directly over the heads of the patrol. There, at a height of about two hundred feet, it became stationary.

The patrol hugged the ground, hoping that the observer would not see them. At first it appeared that he had not. Then the officer took field glasses. Suddenly he reached for the telephone and appeared to be reporting the presence of the patrol. The patrol leader imagined he could hear the German officer giving directions to the German

batteries.

Four shells fell in the rear of the patrol, four more a little in front, then rapid fire commenced. A salvo dropped in the middle of the patrol; then another, and another. The patrol was pinned to the ground; by now every man had received a slight wound. Another danger had to be considered—the Germans in the village would soon be after them.

FOURTH REQUIREMENT.—The action and orders of the patrol leader.

SOLUTION TO FOURTH REQUIREMENT.—The patrol leader got up and shouted the following order:

"Every man run fifty yards to the right, then double back toward home—every man for himself."

DISCUSSION

As a last resort a patrol should scatter—every man for himself—but unless the mission is completed, it should reassemble at some point previously designated and continue on its mission. The empty German trench would have been a good point to designate.

By the patrol's sudden move in an unexpected direction and then scattering, the German artillery was shaken off. The men succeeded in getting back to their lines without further mishap.

The Colonel was much amused with the lieutenant's account, but was pleased with the report.

NOTE.—This problem was based on an account of a daylight patrol from *"Langemarck and Cambrai"* by Captain Geoffrey Dugdale, M.C.

PROBLEM NO. 2

A NIGHT PATROL

On November 7, 1918, an American infantry platoon relieved a platoon of another division in the front lines west of Chatillon.

During the following two days orientation was completed and the platoon waited for something to happen. Occasionally there was a sharp exchange of machine-gun fire, but not a shot fired by the platoon.

On the afternoon of the second day the platoon leader was given the following order by his company commander:

"Tonight," said the Captain, "you are to take a small patrol, proceed to the village of Blanzee, and find out if that village is occupied by the enemy. If you should find the enemy there, bring back some prisoners."

Blanzee was about a kilometer and a half immediately in front of the position occupied by the platoon, just within the German lines. It had been destroyed; only a few of its stone walls were still standing. (See Figure 8.)

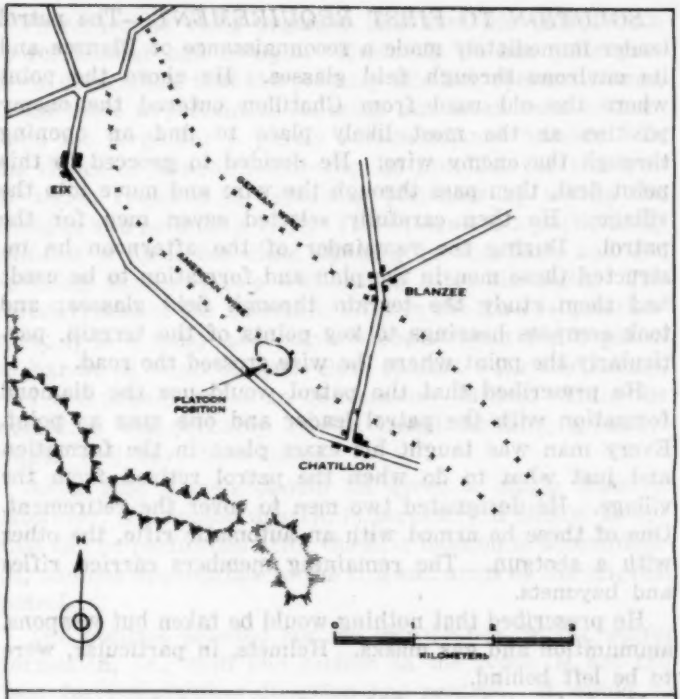


FIGURE 8

***FIRST REQUIREMENT.*—Action and orders of platoon leader during remainder of afternoon with regard to preparations for the patrol.**

SOLUTION TO FIRST REQUIREMENT.—The patrol leader immediately made a reconnaissance of Blanzee and its environs through field glasses. He chose the point where the old road from Chatillon entered the enemy position as the most likely place to find an opening through the enemy wire. He decided to proceed to this point first, then pass through the wire and move into the village. He then carefully selected seven men for the patrol. During the remainder of the afternoon he instructed these men in the plan and formation to be used; had them study the terrain through field glasses; and took compass bearings to key points of the terrain, particularly the point where the wire crossed the road.

He prescribed that the patrol would use the diamond formation with the patrol leader and one man as point. Every man was taught his exact place in the formation and just what to do when the patrol retired from the village. He designated two men to cover the retirement. One of these he armed with an automatic rifle, the other with a shotgun. The remaining members carried rifles and bayonets.

He prescribed that nothing would be taken but weapons, ammunition and gas masks. Helmets, in particular, were to be left behind.

He designated 9:00 PM as the time of departure and 8:30 PM as the hour for assembly and inspection.

At the designated hour he inspected the patrol members to assure himself that all were properly equipped and in fit condition.

DISCUSSION

The platoon leader has made thorough preparation for his task. Little of importance has been overlooked. In making his plans, however, he has been faced with a perplexing difficulty in that his mission is a double one. He has been given a simple reconnaissance mission to find out if Blanzee is occupied, but in addition to this he has been told to bring back prisoners if he should find the enemy there.

Therefore he must organize and arm his patrol both to reconnoiter and to fight. Evidently he has quite properly determined that the primary mission, reconnaissance, is the more important as he takes but seven men, a force none too large for a purely reconnaissance mission. In his choice of weapons, however, he provides for the type of action required in capturing prisoners by taking the shotgun and automatic rifle. The shotgun is a particularly suitable weapon for close fighting in the dark and for covering the inevitable withdrawal after the fight. The effectiveness of the automatic rifle in the dark is questionable; it is a noisy and cumbersome weapon for a patrol to handle at night in such close contact with the enemy, and will usually prove an unnecessary burden. Since the operation will probably involve trench fighting, grenades might well have been taken.

As a rule patrols should be given a single mission. However, if a second mission is necessary it should be one that can be performed after the first mission is accomplished, and one appropriate to the size and arms of the original patrol.

The position selected for his own station in the patrol formation, i.e., with one soldier as the point, is not the best for maintaining direction and control. It would be better for the patrol leader to march near the center of the formation, using a pair of scouts for the point.

Due to their noise producing possibilites, helmets are unsuitable for night reconnaissance at close quarters.

SITUATION, CONTINUED.—With nightfall came rain. Having inspected the patrol, the platoon leader led it through the wire at 9:00 o'clock. The patrol, marching by compass, moved forward slowly with reduced intervals and distances. Upon reaching the point where the old road entered the German wire an open approach trench was found which led under the wire into the village.

SECOND REQUIREMENT.—Action of the patrol leader.

SOLUTION TO SECOND REQUIREMENT.—The patrol leader at once led the whole patrol directly through the trench into the main street of Blanzee.

DISCUSSION

The mission of the patrol is to find out whether the village is occupied and if so to bring back prisoners. This is a double mission. But the enemy must be found before he can be captured; hence the mission up to this time is one of reconnaissance.

Finding an open trench through the wire indicated one of three possibilities: (1) that the trench had purposely been left open for the use of enemy patrols; (2) that it leads into an ambush; or (3) that the position is not occupied at all. Pushing immediately through the trench with the whole patrol was an action more appropriate for a trench raid. Without a prearranged plan for fire support and intimate knowledge of the lay of the land, this procedure was rash; success would depend on blind luck more than anything else. To remain in ambush at the entrance to the trench in the hope of picking up enemy patrols using the trench would have been too indefinite. If the position had been evacuated this action would have been tantamount to abandoning his mission. Caution and stealth are the means best suited to accomplish the purpose in this situation. Therefore a better solution would have been to send a pair of scouts through the trench to investigate while the remainder of the patrol waited for the scouts' report near the trench entrance.

SITUATION, CONTINUED.—Up to this time the patrol had made no noise, but when it reached the street of Blanzee, one of its members, wearing rubber hip boots (these had escaped detection when the patrol was inspected) fell over a stone pile. In trying to regain his balance he banged his booted feet against everything in reach, making almost as much noise as a carload of horses. A flare caught the patrol pinned between two stone walls and a machine gun, a short distance up the street, swept it with fire. While the men scrambled for cover behind

piles of stone, the automatic rifle and the shotgun went into action, firing at the blasts of the machine gun. At this, the enemy gun ceased firing but a great commotion could be heard up the street. Two of the men of the patrol were groaning. With the shotgun and automatic rifle covering the withdrawal, the patrol left Blanzee the same way it had come in, but a great deal faster. One of the wounded men had to be left behind. In the confusion following the hasty exit from the village, all directions were lost for a while. After a little, however, the patrol leader, using his compass, was able to lead his men to the right place in their own lines without further incident.

DISCUSSION

Undoubtedly this patrol accomplished the first part of its mission: it definitely determined that Blanzee was occupied. However, the faulty method used in entering the enemy wire and the previous failure to detect the rubber boots at inspection not only jeopardized the patrol's chances of success, but might easily have resulted in its capture or destruction. The patrol leader was amply rewarded for his foresight in taking preliminary compass bearings. Although he lost all sense of direction just after the hasty exit, he was soon able to lead the patrol back to its own lines.

PROBLEM NO. 3

A PATROL TO CAPTURE PRISONERS

During the latter part of September, 1918, an American company occupied a position in the front line as shown on the sketch. (Figure 9) In front of the position lay the wooded valley of the Moulon Rau and on the high ground on the other side was the famous Hindenburg Line.

During the St. Mihiel offensive just ended the company had lost all of its officers except one, the present company commander. Shortly after it arrived in the new position a lieutenant, freshly graduated from an officers' school in France, was assigned to the company.

About noon of the second day, the company commander

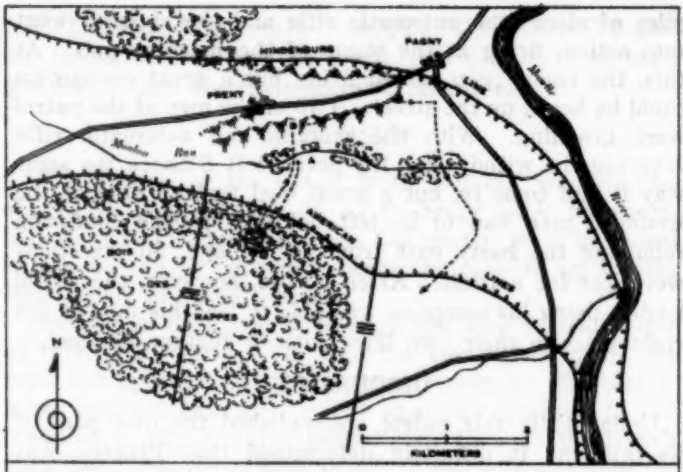


FIGURE 9

received orders to send out one platoon that night to get prisoners. The brigade commander, a most aggressive individual, demanded prisoners every night.

An enemy outguard was known to be posted in the Moulon Ravine at dark each night.

The company commander, thinking the new lieutenant needed a little breaking in and assuming that because he had completed the officers' school he was capable of doing the job, detailed him as leader of the patrol.

The lieutenant set out with the platoon at 9:00 PM. In about thirty minutes, the peace and quiet of the front was disturbed by a series of explosions and sounds of men crashing through the woods. In came the patrol on the run. Their wind was up and up high.

This is what had happened. When the patrol had reached the Moulon Rau (near point A) it was challenged. The lieutenant, in answer to the challenge, gave the command: "Throw grenades". After the grenades had exploded, instead of the expected command to charge, the

lieutenant gave the order, "To the rear, double time".

The company commander then had the humiliation of sending a message to the rear stating that the patrol had gone out, met resistance, and returned without prisoners. In the same message he requested permission for the company to repeat the attempt the next night.

DISCUSSION

The similarity between this situation and that of the British company described in Problem No. 1 again emphasizes the importance of selecting capable patrol leaders and the necessity for careful training in this type of work. Here again, the company commander would have done well had he asked the patrol leader what his plan of action was before allowing him to go out.

The use of grenades against such an indefinite target was ill advised. It not only aroused the whole front, but definitely precluded any chance of accomplishing the mission that night. There might have been a slight chance of success if the grenade throwing had been followed by a quick, determined rush.

SITUATION, CONTINUED.—As requested, orders were received early the next morning directing the patrol to go out again at 9:00 PM that night. At the same time the company commander received sixteen short-barreled shotguns and four boxes of ammunition for the patrol.

The morale of the company had been seriously affected by the poor showing the night before; consequently the company commander determined to lead the new patrol himself.

FIRST REQUIREMENT.—Action and orders of the company commander for the preparation and organization of the new patrol.

SOLUTION TO FIRST REQUIREMENT.—The patrol leader hand-picked twenty-five men instead of taking the whole platoon as ordered. One of the men selected could speak German. He armed sixteen men with shotguns and bayonets, the remainder with rifles and bayonets, or pistols. No grenades were included. Each man was given a number ranging from one to twenty-five.

The company commander assured himself that all men knew their numbers and that the men armed with shotguns knew how to use them.

That afternoon, accompanied by certain selected noncommissioned officers, he went to the edge of the woods and made a study of the terrain. Again, one hour before dark he took the entire patrol to a position in the north edge of the Bois des Rappes where all the ground to the front could be seen. There he explained his plan in detail.

Between dusk and dark the patrol was to go out of the lines in single file, cross the Moulon Rau, and on the far side form skirmish line with intervals such that each man could touch the shoulder of the man on either side. It was to proceed in this formation to the ridge between Preny and Pagny, jumping any Germans encountered If no Germans were found by the time the ridge was reached the patrol was to execute "by the right flank" and move to the east; then executing a second "by the right flank", move toward its own lines, thus making a clean sweep of the area.

DISCUSSION

This solution is an example of the detailed preparation and planning necessary for a patrol assigned this type of mission.

The size of a patrol depends on three things: (1) its mission; (2) the size of the unit it expects to encounter; and (3) the number of men that can be controlled by the leader.

In this instance the patrol has to take prisoners: this probably means a fight. The patrol leader expected to

capture some prisoners from the outguard that is posted nightly in the Moulon Ravine. He selected twenty-five men, a number that he believed large enough to accomplish this purpose.

He picked his men. This is a much better procedure than taking a unit as a whole for it is obvious that there are many individuals in a unit the size of a platoon who, for various reasons, are unsuited to patrol duty.

The patrol leader changed the time of departure from the ordered hour: 9:00 PM, to the period just between dust and dark in order to get across the Moulon Rau before the German outguards took up their positions for the night.

His decision not to take grenades was based on the experience of the previous night and the probability that no trenches would be encountered.

The formations to be used in moving toward the German line do not provide all-around protection and are difficult to control. Small groups in single file with a point, flankers and rear point, or some application of the inverted V or the diamond formation, would have been a safer formation, more easily controlled.

SITUATION, CONTINUED.—The patrol moved out as planned, taking advantage of all folds in the ground. Sometimes the company commander, who was leading the way, crawled; sometimes he walked; the men, following in single file, conformed to his example.

The patrol crossed the Moulon Rau, formed a skirmish line, and moved on. Nothing was heard from the German lines to the front or the outpost line that was now to the rear. Grass was about knee high, there was no moon, and as yet no stars. The patrol moved by bounds: i. e., it moved forward twenty or thirty paces, halted to listen, and then moved forward again. The company commander, with the German speaking soldier by his side, marched in the center of the line.

Finally, the road that ran along the ridge from Preny to Pagny could be made out to the front. At this time the company commander heard wagons moving along the

road from the west. He estimated that his patrol was about two hundred meters from the road (Point B on the sketch) and that the wagons would soon be directly to his front.

SECOND REQUIREMENT.—Decision of the patrol leader at this time.

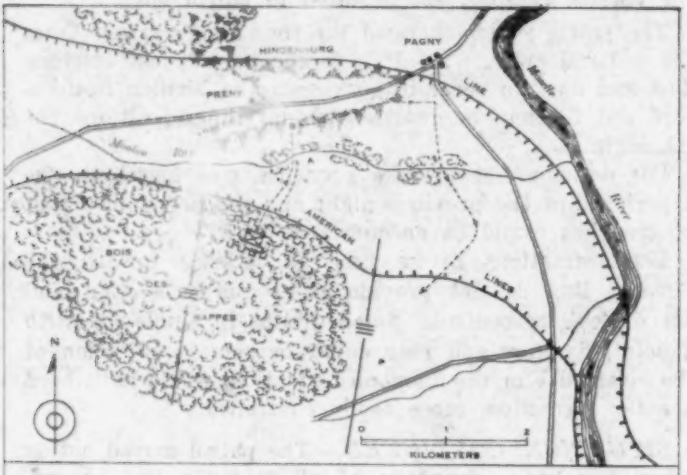


FIGURE 9

SOLUTION TO SECOND REQUIREMENT.—The patrol leader decided to let the wagons go by and take advantage of the noise made by them to execute "by the right flank" and move to the east in accordance with his original plan.

DISCUSSION

The opportunity presented by the wagon train for the capture of prisoners was too good to have been passed up. One prisoner may not be as good as another, but this was no time to be too choosey. A teamster, preoccupied with his animals is particulary vulnerable and easy to surprise. By waiting until the train had passed, the last one or two wagons could be easily, quietly, and quickly cut off and their occupants captured, thus fulfilling the mission of the patrol.

All noises, such as that made by the wagons, should be used by patrols to cover movement at close quarters.

SITUATION, CONTINUED.—The patrol leader moved the patrol by its right flank to the east, paralleling the road. He moved in this direction until he estimated he had covered three or four hundred yards, then halted the patrol and faced the skirmish line toward the Moulon Ravine and the American lines. The patrol, advancing cautiously, got within about fifty yards of the brush and trees in the Moulon Rau (at Point C on the sketch) when the officer heard a noise in the undergrowth to his left front. He had the patrol take cover instantly. Nothing could be seen in the woods. Noises that he thought were machine-gun or rifle bolts being worked were plainly heard. Almost at once the patrol was challenged by the Germans in the woods.

THIRD REQUIREMENT.—Action and orders of the patrol leader at this time.

SOLUTION TO THIRD REQUIREMENT.—He told his German-speaking soldier to answer the challenge, engage the Germans in conversation and tell them that it was a German raiding party. While this was going on he went to the corporal of his right squad and gave him this order: "Corporal, stay out of these woods until I send for you. Use your squad to stop any Bosche from coming in on us from Pagny. Stay out of this fight."

He then ordered in a loud voice, "Let's go in. Be sure to keep prisoners. Don't shoot your own men", and started forward into the woods.

DISCUSSION

Prompt action was imperative. It was only a question of time before the Germans would have suspected the true identity of the patrol. No time was available for an elaborate plan, but security was vital. By placing a squad to the rear, the patrol leader covered the most dangerous threat. In addition, however, he should have posted a few men on each flank as an additional security measure.

SITUATION, CONTINUED.—The patrol moved toward the woods at the double time, the men keeping abreast of the leader. When the patrol was about fifteen paces from the edge of the woods, a German ran out toward it, then changed his mind, dashed off to the left and got away. He was immediately followed by another but this one was killed by one of the men with a shotgun. The patrol then rushed into the woods and amongst the enemy. Bedlam reigned supreme; every one was yelling and fighting.

Suddenly the noise heightened. Men came rushing into the woods. The patrol leader believed they were Germans from Pagny. Fortunately they proved to be the squad that had been detailed to cover the rear. The men had gone absolutely crazy and, yelling at the top of their lungs, had rushed into the woods to join the fight.

It was now apparent that the patrol had been there long enough so the company commander started his men out of the ravine. He had to make two trips back into the

woods to get them all; they persisted in searching the underbrush for more Germans. Numbers were called from one to twenty-five and a man answered for each number. There had been no serious casualties.

By this time the front was "up". The shotguns had seemed to make more noise than "one-pounders". Flares were going up from the German lines and both sides were turning loose machine guns and artillery. In squad columns, with three prisoners holding hands in front, and leading the way, the patrol began its return.

After proceeding a short distance, one of the prisoners started to pull back. Some one struck him in the buttocks with a bayonet but he continued to pull back. The interpreter spoke to him to find out the trouble. He answered: "In the direction we are going there are many Germans, they will kill us all, the American lines are farther to our right." The other prisoners vigorously denied this but to no avail. Direction was changed to the right and fortunately so. The patrol returned to the American lines in the sector of the regiment on its right and at some distance from the point where it had gone out. If it had continued in its original direction, it would probably have run into a strong force of Germans on the banks of the Moselle.

The first officer encountered was an artillery observer. He was told about the wagon train and informed that it was probably in Pagny at that moment. The artilleryman said he would try to get it.

The brigadier was delighted with the results of the patrol and profuse in his praise of the company. He told the regimental commander, "These are the men who will win the war. This officer should be made a captain at once."

To the patrol leader he said, "This is good work. Go out there tomorrow night and do the same thing."

DISCUSSION

We can easily picture a melee of the sort that occurred in the wood and the difficulty of telling friend from foe. Some conspicuous means of identification would have been

most helpful.

The company commander's foresight in numbering the patrol members undoubtedly helped materially in collecting his patrol for the return. On the other hand, his failure to take compass bearings to outstanding terrain features, before starting out, very nearly caused the patrol to blunder into the German lines on the return trip. Only the fear of the German prisoner saved them.

The value of including an interpreter in a patrol is well illustrated in this action.

CHAPTER III

The Trucks Get Through—Cross-Country

IN WHICH WE FOLLOW A MOTOR TRANSPORT TRAIN THROUGH THE TRIALS AND TRIBULATIONS OF A HARD MOVEMENT ACROSS COUNTRY AND SEE THE APPLICATION OF SOME OF THE AIDS AND EXPEDIENTS RESORTED TO BY A RESOURCEFUL LEADER IN OVERCOMING DIFFICULTIES CHARACTERISTIC OF SUCH A MOVEMENT.

"Colonel Jones, Division Quartermaster, speaking—Oh yes, General—Oh—Errr—Aaaa— Ammunition? — Stormy Point—201st Infantry—Oh yes, but General, it has been raining and the roads——x x x——x x x——Oh, yes sir (meekly)—six o'clock tonight—x x x Yes sir—bang!" Colonel Jones hung up the phone with an expression of deep relief, and called for a runner.

"Go up to the truck park and get Captain Strong. Tell him to come up here right away".

Colonel Jones is at the little village of Reliance, the railhead of the 60th Division. The time is 6:00 AM.

The 60th Division, a National Guard organization, has been holding part of the first line of defense along the frontier pending the mobilization of reserves. The 201st Infantry is located near Stormy Point at a mountain pass on the flank of the main position. For several days the regiment has withstood repeated attacks of hostile militia and irregulars.

Presently Captain Strong, the commander of Company No 1 Quartermaster Regiment, entered the Colonel's office.

"It's about that ammunition for the 201st Infantry", snorted the Colonel. "The General is all excited about it —just gave me a hiding over the telephone. You are elected. Here is a list of the ammunition. Load up and take it to Stormy Point. Get going as soon as you can. You may have plenty of trouble because of these rains but I'm depending on you to do the job. The General said that if the ammunition didn't reach the 201st Infantry by six o'clock tonight they would have to withdraw. You know what that means. Furthermore, what

will happen to us if it doesn't get there will be just too bad."

"Phew! It's a good thing we got that pioneer truck with those gadgets all fixed up yesterday", said Captain Strong to his first sergeant as his light reconnaissance car skidded around a curve of the muddy road.

"That last trip sure taught us a lesson. We ought to be able to go anywhere now", grumbled the sergeant. "I told the men to get everything ready before we left. I thought there would be something doing."

"That road to Stormy Point wasn't so good the other day", grunted the Captain as the car pulled up at the truck park. "Those old bridges looked as if they might go out anytime and that rain yesterday didn't help them a bit."

At the truck park Captain Strong found everybody excited and busy. Drivers were checking and tuning up their motors. Light bulbs were being replaced, adjustments made. The men had smelled a rat when the captain was called to headquarters.

The trucks, which had been purchased in the national emergency from the stocks of leading manufacturers, were of the one and one-half ton, dual wheel, commercial type, similar to those purchased for the Civilian Conservation Corps in 1933. So far the company had received only twenty-four, just enough for one platoon.

Captain Strong was the only officer with the company. He lost no time. He assembled his noncommissioned officers and issued the following orders:

"We are going to Stormy Point with ammunition. The 201st Infantry at the pass is in a bad way. We must get the stuff through by six o'clock tonight.

"First Sergeant, take the train down to the dump and get the ammunition called for on this list, then come back here.

"Supply Sergeant, load that pioneer equipment that we fixed up yesterday on one truck.

"We leave here just as soon as we can get loaded up. Move out."

While the trucks were being loaded the captain received word that forty replacements for the 201st Infantry had arrived at the railhead and would be taken along to Stormy Point.

"Good!" thought the captain. "They will prove useful in manhandling these trucks or I miss my guess."

Having a little time on his hands, he went over to watch the loading of the pioneer equipment. Here is what he saw loaded on the truck:

1 block and tackle set (double with 250 feet of 1-inch rope)
4 pairs of wheel mats, made of 1-inch plaited rope
2 towing bars
25 pieces of half-inch rope, each 20 feet long
1 roll of 12 gauge wire (400 feet)
24 short pieces of heavy chain with special end links
4 axes
4 long handled shovels
4 picks
4 lanterns
4 heavy timbers, 12 feet long, 4 inches thick and 10 inches wide.
15 pieces of heavy planking, 9 feet long, 2 inches thick and 10 inches wide.

The reconnaissance car carried a shovel, an axe and a set of patented traction devices.

Each truck carried:

1 short handled shovel
1 pick
1 axe
1 set grouser ropes (8 in each set)
1 tow chain.

This equipment, assembled with much difficulty and considerable "chiselling", was the result of the bitter experiences of the last trip over the rapidly deteriorating road and the determination of the captain not to be caught off base again.

By nine o'clock the train was loaded and ready to go. The captain noted with satisfaction that the sky was clear,

the weather warm. Fortunately, the ammunition had required only twenty trucks, which left, in addition to the pioneer truck, three empties. On two of these he loaded the forty soldiers. The other he used to carry a supply of gasoline (in milk-can containers), oil and food.

The captain moved to the head of the column in his light reconnaissance car, signalled "forward", and the train moved out. With the captain rode the 1st Sergeant, the chauffeur and an extra man. The two assistant truck masters, mounted on motorcycles, rode at the head of their respective twelve-truck sections. The pioneer truck and the trucks carrying the men led the column, while the truck carrying the gasoline brought up the rear.

As he drove along, the captain studied his only available map, an automobile road map. The details on it, though not very satisfying, had, by this time, been considerably amplified by notes made on previous trips.

About five miles from Reliance the column made a routine halt. At this halt the captain directed the assistant truck master of the leading section to ride ahead on his motorcycle and take a look at the two bridges where the road crossed Green Creek. (See Figure 10.)

In fifteen minutes the assistant truck master returned and reported that the bridges were out and the creek was still high.

The captain told the assistant truck master to take charge of the train. He moved forward rapidly in his reconnaissance car to have a look for himself.

As he cleared the hill and the bridges came into view, he felt a sinking sensation in his diaphragm. No doubt about the bridges being out, and with them his road to Stormy Point. The only other way to get anywhere near Stormy Point required a double back of forty miles and even then Green Creek would have to be crossed.

"Guess we will have to go cross-country, sergeant. We've got to get that ammunition up before night somehow."

The ground to the left of the road is shown in Figure 10. To Captain Strong, it appeared possible to skirt the edge of the valley and get back to the road at a point beyond the second bridge (Point E).

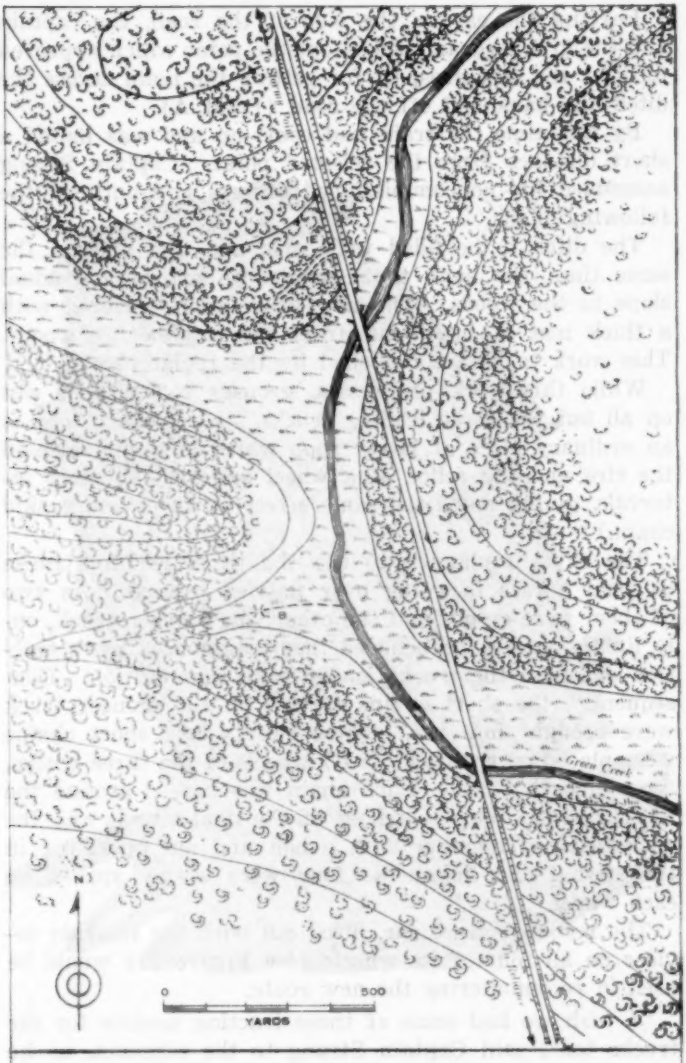


FIGURE 10

Leaving the car on the side of the road; the captain and the first sergeant picked out the point which appeared to offer the best prospect for getting the train across the ditch and bank and off the road (Point A).

By this time the train had come up and was halted a short distance from the selected point. Captain Strong assembled his noncommissioned officers and outlined the following plan:

The ditch to be filled with rock and dirt and, at the same time, the bank to be graded to afford a gradual slope to the woods. The new grade to be covered with a thick mat of brush cut from the neighboring woods. This work to be accomplished by the replacements.

While this work progresses, grouser ropes to be put on all but the three leading trucks. (A grouser rope is an ordinary piece of heavy rope which is wound around the tire and the felloe of a wheel and tied at short intervals, giving much the same effect as an ordinary skid chain.)

The captain planned to use the three leading trucks as trial horses in going over untried ground. As two of them were empty and the other, the pioneer truck, only lightly loaded, he believed they would need more traction aid than the trucks loaded with ammunition. Consequently, the short chains carried on the pioneer truck were brought into use. These twenty-four short chains were placed on the rear (dual) wheels of the three trucks, four on each wheel. Each chain was passed around the two tires and the two felloes of the dual wheels and the ends fastened together with a bolt and nut operating in the special end links; the four were evenly spaced on each wheel.

The reconnaissance car, fitted out with the traction devices on all four of its wheels (see Figure 11) would be used in reconnoitering the new route.

"I wish we had some of those traction devices for the trucks too", said Captain Strong to the sergeant, as he watched the mechanic placing them on the reconnaissance car. "If the colonel doesn't get us some by the time we get back from this trip, you and the mechanics are going

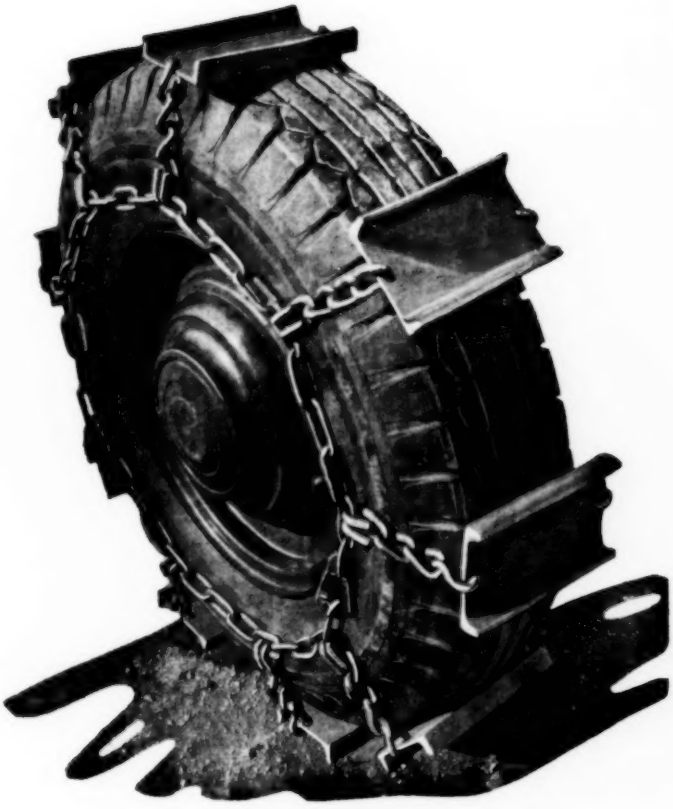


Figure 11.

to have the job of making some. It could be done easily with some angle irons and heavy chains. You just use longer and wider plates in order to cover both of the dual wheels, fit them closer together, and fasten them at their center to a heavy chain which rides in the groove between the two tires. When you get through you have a regular caterpillar tread."

With the aid of all hands, the reconnaissance car was lifted and pushed across the ditch. Leaving the work of constructing the fill and cut in the hands of one of the assistant truck masters, the captain and first sergeant set out on a reconnaissance of the route.

The ground along the edge of the woods being firm, it appeared that the trucks would be able to get along there without difficulty. However, about eight hundred yards farther on, a small, narrow gully, about six feet wide and ten feet deep, obstructed the way. The gully was about half full of water.

After an unsuccessful attempt to circumvent the gully by following it up the slope into the woods, the captain decided that nothing less than a bridge would suffice to get the train across.

By this time the trucks had started to move off the road and the captain went back to see how they were getting along. The ditch and bank were crossed with little trouble, but in moving over the wet, slippery clay along the edge of the woods the rear wheels of many of the trucks slipped and dug in. By a judicious use of wheel mats under the rear wheels of those trucks in difficulty the train reached the gully without serious delay.

As soon as the pioneer truck with the bridging material came up, work began on the bridge across the gully. (Point B on the sketch was selected for the crossing.) The heavier timbers were laid across the gully and so spaced as to come under the truck wheels. The planks were then laid crosswise.

Without waiting for the bridge to be entirely completed the captain crossed in his car and moved forward for further reconnaissance. Before leaving, he directed

the assistant truck master to lash logs along the edges of the bridge as guard rails and bolster up the center of the span.

The reconnaissance car moved on without difficulty until it attempted to cross the nose of the ridge near the creek. (Point C.) Here the car started to slip sideways in the wet clay, the traction devices throwing a stream of clay and mud to the rear. Sliding from side to side, it finally reached the low grassy ground beyond.

This low ground, although wet, was generally firm. Farther on, however, a shallow dip or slough had to be crossed. Here the ground was soft and muddy. Although the reconnaissance car made its way through, the captain had serious misgivings as to the ability of the trucks to follow. Beyond the low spot, and for the remainder of the distance to the road, the going was good. It appeared to the captain that the battle would be won if he could get his trucks beyond the slough.

Having completed his reconnaissance, he now returned to see about the bridge. Shortly after his arrival the bridge was completed and he gave the order for the trucks to begin the crossing. Satisfied that the bridge was all right, he then proceeded to Point C to observe the progress of the leading trucks across the slippery nose.

When the first truck reached the nose, the rear wheels began to spin and the truck slid sidewise toward the creek. The captain ordered the driver to stop the motor, called up all the men available and put as many as he could on the downhill side of the truck to push and attached several of the twenty-foot ropes from the pioneer outfit to the uphill side for men to pull on. He then signalled the driver to start the motor. It was a tug of war when the truck got under way but in the end the ridge was safely negotiated.

Before the next truck was allowed to move forward a mat of brush was laid on the ground in the hope of furnishing better traction. This mat of brush, coupled with the previous procedure enabled the other trucks to negotiate the slippery nose without mishap.

Much impressed with the added traction furnished by the brush, the captain had more of it placed across the low grassy bottom that lay ahead. As the leading truck reached the lowest point (Point D) in the slough, its rear wheels began to spin, throwing the brush in all directions. The rear wheels were soon buried up to the axle housings and the front wheels almost to the axle.

"Hold everything"! shouted the captain.

"Get that block and tackle, sergeant. Hook one end on that tree across the low ground and the other end on the front of the truck, then bring the fall (pulling) line over to this side and fasten it on this second empty truck." (See Figure 12.)

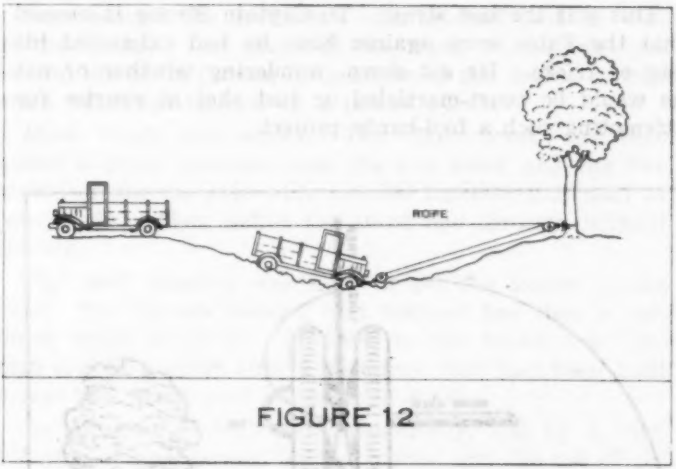


FIGURE 12

The pulling power furnished by the empty truck, acting through the block and tackle, combined with all the man power available, succeeded in dragging the mired truck across the low ground to the good footing on the flat rise beyond, where it was again able to move under its own power.

Before attempting to send more trucks over, the cap-

tain had more brush placed on the ground. But this time he had the brush tied into bundles, or fagots, about a foot in diameter. When this was finished the second empty truck was started across on its own power. It made little more headway than the first and was soon hopelessly mired.

This time the captain tried using the truck already across as a tow truck but without any success. The towing truck could not budge; its wheels began to spin and dig in. The block and tackle was again rigged up.

As the driver of the tow truck started to make the pull he misjudged the slack; the sudden jerk put a tremendous strain on the blocks. Under this strain one of the blocks gave way, splitting the wood frame and tearing it up to such an extent that it was of no further use.

This was the last straw. To Captain Strong it seemed that the Fates were against him; he had exhausted his bag of tricks. He sat down, wondering whether or not he would be court-martialed or just shot at sunrise for attempting such a fool-hardy project.

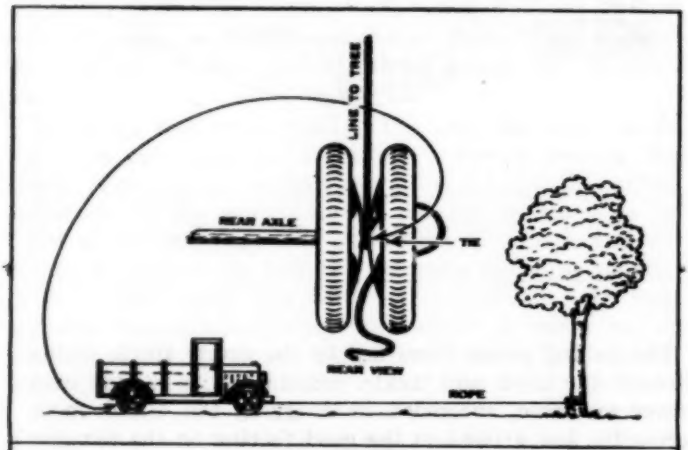


FIGURE 13

Just then Sergeant Clutch, a hard boiled oldtimer, came up. "I've got an idea, captain—and I've seen it work before."

"We don't need them blocks noway," said Clutch, "all we got to do is take one end of the rope and tie it to the tree. See Figure 13. Then we take the other end and run it back under the truck between the front wheels and take a turn or two around the spacer between the two wheels of one of the duals. After that we tie the end of the rope onto one of the wheels or, if we cross our turns as they go around the spacer, we don't need to tie it at all. Now, all we go to do is just start the motor and she just winds up the rope and climbs right out of the mud".

"Well, go ahead and try it sergeant, I'm willing to try anything to get out of this mess."

Sure enough the sergeant's idea worked just as well as the blocks. The power of the truck wound the rope around the drum formed by junction of the double wheels, much after the fashion of a power winch.

More brush was added. The third truck was then halted a short distance from the low point and the two trucks on the far side were coupled together and used as tow trucks. They pulled the third one through without trouble.

The next question was how to get the loaded trucks over. The captain decided that nothing less than a corduroy road would do. So back to the forest went the men and in a short time a corduroy road had been built across the worst part of the mud hole.

By constantly repairing the corduroy, and by a combination of man power, towing trucks, and the use of the sergeant's idea, the train was finally coaxed across the low stretch to the safe ground beyond. From here on all went well and the train was soon approaching the road at a point just beyond the second bridge.

A cut was found in the bank (Point E) where an old trail had joined the highway and the train was able to get back on the road without difficulty.

As the last truck swung into the road the captain

emitted a great sigh of relief; he felt that his troubles were over.

In this he was mistaken. About a mile farther on, the road made a sharp dip across a narrow valley and, at the low point, was crossed by a small culvert. The recent flood had washed a deep gash on both sides of the culvert.

Getting out the shovels from the pioneer truck, the men hastily threw in a little dirt from the side of the road and the train started forward. The first three trucks got across with little trouble, but no such luck with the loaded trucks. As the front wheels of the first one reached the culvert the newly filled roadway caved in from the undercutting of the water; the truck buried its nose against the edge of the culvert clear up to the bumper. Efforts to get it out under its own power only made matters worse. The steep step-up to the culvert in front prevented any forward movement, and the slippery slope in rear made it impossible for the other trucks to get enough traction to pull the truck backward.

The only solution of the problem was to raise the front end to the level of the culvert and then fill in underneath. Once again the captain was equal to the emergency. He sent into the woods for two ten-foot logs, eight to ten inches in diameter. These he had lashed together at one end, forming an A frame. He then stood this frame up on the culvert with the legs inclined toward the mired truck. Just underneath the fork of the frame, he lashed the remaining block from the block and tackle. Then, fastening one end of a tow rope to the center of the front axle, he threaded the other end through the block and between the legs of the frame to the rear end of one of the empty trucks. (See Figure 14.)

When everything was ready, the empty truck took up the slack on the tow rope and began to pull. The action of the rope through the block and the forward revolution of the A frame about its legs lifted the front end of the truck, carrying it forward and dropping the front wheels on the edge of the culvert.

The truck was quickly blocked and the ditch filled with

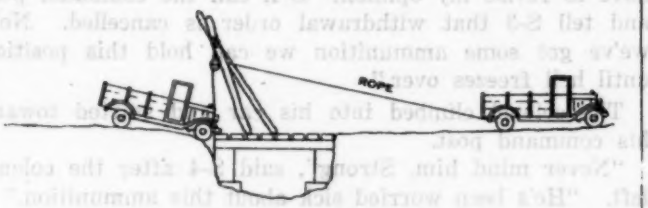


FIGURE 14

earth and logs. The truck then moved across the culvert under its own power. The captain took no more chances; he carefully prepared the approach to the culvert before allowing the remainder of the train to move forward. It was just getting dark when the last truck cleared the culvert.

The remaining two miles to Stormy Point were covered without further trouble and the train rolled into the regimental distributing point near Stormy Point at the stroke of six.

Colonel Thrust was the first person encountered. As soon as Captain Strong came within hearing he began: "It's about time you got here. What have you been doing all day, taking a joy ride? Think we can fight these people with bolos? Colonel Jones told me you left at nine o'clock", and so and so——.

Captain Strong finally managed to get in a word of explanation about the bridges and the cross-country movement.

"Well", said the colonel, somewhat mollified. "I guess you did a pretty good job after all. I've told the general again and again that an outfit can't be properly supplied

by motors, but after this job of yours it looks as if I'll have to revise my opinion. S-4, call the command post and tell S-3 that withdrawal order is cancelled. Now we've got some ammunition we can hold this position until hell freezes over."

The colonel climbed into his car and started toward his command post.

"Never mind him, Strong", said S-4 after the colonel left. "He's been worried sick about this ammunition."

"I know", replied Strong, "but he's all wet about the motors. We got here didn't we?"

That night as he made his bed in the bottom of one of his trucks, Captain Strong thought over the events of the day. The thought uppermost in his mind was the amount of time that could have been saved by a few minutes of careful preparatory work. For instance, if he had repaired that culvert properly in the first place he would have saved himself time and trouble. The same applies to reconnaissance. The time spent on reconnaissance before leaving the road will be well repaid in time saved after leaving it. In other words, "Look before you leap."

Captain Strong's thoughts then wandered to the devices and aids included in his pioneer equipment and to what he could do to improve or enlarge upon them. He felt that chains were better than grouser ropes for wheels—he would get more of them. The other things had worked pretty well—that was a great idea of the sergeant's—the traction device was the berries. He finally fell asleep figuring a way to improvise some for his trucks.

Figure 15.

Figure 16.

CHAPTER IV

Recent Developments in Infantry Weapons

THE NEW 37-MM GUN AND THE STOKES-BRANDT MORTAR

The close of the World War found the United States Army equipped with the 37-mm Gun, Model of 1916, a weapon of French development, and the 3-inch Trench Mortar, commonly known as the Stokes Mortar, a weapon of British development. These weapons, devised for the close support of the rifle companies, had proved to be very effective for this purpose. The range of the mortar, however, was extremely limited (750 yards), making it practically valueless in any but stabilized warfare. The development of the tank threw on the 37-mm gun the added burden of antitank defense, for which it had not originally been designed. Consequently, efforts to improve these weapons have been to make the 37-mm gun a more effective antitank weapon and to increase the range and accuracy of the mortar.

The New 37-mm Gun, M2

The gun now adopted as standard is known as the 37-mm Gun, M2, (Figure 15) and will replace the 37-mm Gun, Model of 1916, as funds become available for its manufacture.

While a discussion of the characteristics of the ideal antitank weapon and the extent to which its characteristics should be incorporated in a battalion weapon is beyond the scope of this article, it is necessary, however, to compare some features of such a weapon with the like features of the old and new 37-mm gun. The minimum requirements, it may be stated, are: (1) that an antitank weapon should fire ammunition of sufficient power to be effective against tank protective armor; and (2) that it should be capable of easy and quick manipulation through a wide traversing arc in order for the gunner to lay on and track a rapidly moving target.

Let us consider first the type of ammunition provided

for use in the 37-mm gun to meet these minimum requirements. The projectile is solid, as all efforts to develop a suitable delayed fuze projectile have proven unsuccessful. It has been found, moreover, that upon impact and penetration of armor the solid projectile breaks up into a number of small pieces which still have sufficient velocity to be effective against personnel within the tank.

This ammunition has a muzzle velocity of 1800 feet per second as compared to 1,276 feet per second for the old gun and a much higher penetrative power. The latter is shown by the following table, which gives the thickness of armor plate against which penetration can be obtained with normal impact at different ranges:

Range	Penetration	
	Model of 1916	M2
300 yards	.70 inches	1.20 inches
500 yards	.60 inches	1.00 inches
700 yards	.55 inches	.85 inches
1000 yards		.70 inches

These figures should be considered only as showing the comparative penetrative powers of the two guns and their ammunition. They refer to class-I, homogeneous armor plate. Obviously the penetration will be different for armor plates of other qualities. The plate with which these results were obtained was of the same quality, approximately, as the plate with which our present tanks are armored. Our light tanks have armor varying from 0.5 inches to 0.81 inches. The medium twenty-three ton tank has 1 inch armor. From these figures it can be seen that against tanks similarly armored the new gun can engage light tanks effectively at ranges of 750 yards and less; and medium tanks at ranges of 500 yards and less.

Now let us consider the other minimum requirement for an antitank weapon—that it must be capable of easy and quick manipulation through a wide traversing arc, so that a gunner can lay on and track a rapidly moving traget. The new gun has almost double the traverse of the old gun—67½ degrees as compared to 38 degrees. This is an important characteristic for an antitank weapon

as one of the characteristics of the ideal antitank gun is an *all around traverse*. It means that the new gun can, without shifting the trails, track a tank over a sector about twice as large as can be covered by the old gun. Of course, with the old gun it takes but a few seconds to shift the trails, but it is important to save seconds in meeting a tank attack. In 15 seconds, a tank moving at the rate of 30 miles an hour, will travel 220 yards. The ten to twenty seconds it may take to shift the trails, relay on the tank, and reopen fire, may well mean the difference between a tank put out of action and a 37-mm gun put out of action.

Traverse is accomplished through manipulating a traversing hand wheel, as with the old gun; however, the mechanism has been changed so that one turn of the hand wheel results in a much wider change in direction of the bore. In addition, by means of a lever the gun can be given a free traverse, i.e., traversed simply by pressure without use of the hand wheel. Through this improvement the gun can, with the utmost rapidity, be laid upon a target anywhere within the limits of its traverse and, without difficulty, may track a target moving at any speed yet attained by tanks.

A single sight incorporates the characteristics of both the old telescopic and quadrant sights and is a better sight for either method of laying than the sights now used. Although slightly less in power, the new telescope affords a wider field of vision and a better definition of targets than the old. The horizontal cross hair is fixed in the center of the aperture; the entire sight revolves in a vertical plane about a pivot to give changes in elevation. Thus, vertically, the aiming point is always in the center of the field of view and the maximum sight deflection, 100 mils, is usable at all ranges. In the telescopic sight, with which the old gun was equipped, the maximum deflection, 70 mils, is usable only at ranges between 700 and 1100 yards.

Another necessary characteristic in an antitank weapon is rapidity of fire. In the hands of an expert assistant gunner the rotary breech of the old gun can be operated

effectively and the rapid movement of the barrel in recoil and counter-recoil permits a rate of aimed fire as high as 35 rounds per minute. The new gun is slower in recoil and counter-recoil and it is doubted if as rapid a rate of fire can be attained. However, it should be easier to train a crew to attain a rate of fire of from fifteen to twenty rounds a minute with the new gun than with the old. This is made possible because of the construction of the sliding breech which, upon being released by the striking of a lever, falls of its own weight and in doing so automatically actuates the extracting mechanism. In the old gun, extraction was dependent upon a forcible rotation of the breech. This required a high standard of training for its rapid operation.

Another major item that must be considered in judging the suitability of any weapon intended for infantry use is that it should have a mobility at least equal to the mobility of the units for whose support it is intended.

The new gun is transported by the same methods as the old; it is attached to the ammunition cart as a limber and hauled by a mule, hauled on wheels by men of the squad, or broken into loads and carried by hand. In the last case, the new gun is broken into four loads compared to three for the old gun, the barrel and cradle making separate loads. The weights of these loads are shown in the following table:

37-mm Gun Load	Model of 1916 (lbs)	M2 (lbs)
Wheels and axle	166	94
Trails	86	110
Barrel	—	93
Barrel and cradle	88	—
Cradle	—	89
Totals	360	386

From this table it is evident that mobility has been but slightly affected where the gun is transported on wheels. However, two additional men are needed to move the gun by hand but, in considering this additional man-power

requirement it should be remembered that moving the old gun by hand is a backbreaking task. Neither gun can keep up with the rifleman for any great distance when moved in this manner.

In addition to the factor of increased weight, the new gun, because of the extra load when carried by hand and certain details of construction, is not as easily and rapidly handled. The separation of the barrel and cradle necessitates an additional operation in mounting the gun for firing. For a move of any considerable distance, the cradle must be shifted from its firing position to the so called "long haul" position where it is more securely locked to the trail. In this position, there is an appreciable load at the lunette, which is very tiring to the men drawing the piece. In drawing the gun in the "long haul" position, i.e., cradle and barrel in firing position, the men must remain partially bent over for raising the trails will cause the front leg to strike the ground. Some officers believe that hand transportation is impracticable for moves of any considerable distance. Putting the gun into action from the "long haul" position also involves an additional operation—the shifting of the cradle to its firing position. In comparison with the Model 1916, then, the new gun has the disadvantage of increased weight, an extra load, and additional operations.

There are, of course, many other minor points of difference between the two guns which affect the drill and technical training and are of special interest to the howitzer company officer. In summary, the 37-mm gun remains basically the same weapon. It can still be employed, using similar methods of technique, against the same targets as the old gun, although antitank defense will probably become its primary mission. It has been much improved as an antitank weapon but some of the resulting changes have made it less mobile and therefore less effective, as a supporting weapon against stationary targets.

The Stokes-Brandt, 81-mm Mortar

The 3-inch Trench Mortar of World War days was several years ago supplanted by the 75-mm Mortar, M2,

a smooth bore, breech-loading weapon, with a range of 1800 yards and a maximum rate of fire of about twelve rounds per minute. It had a wheeled mount on which it was habitually transported and fired although it could be broken up into loads for transportation by hand. Although it was an effective weapon, it has now been superseded by the much more effective Stokes-Brandt, 81-mm Mortar. (Figure 16, facing page 65.)

As its name indicates, the Stokes-Brandt 81-mm Mortar is a modified and improved Stokes mortar, consisting of a barrel which is loaded from the muzzle, a base plate, and a bipod. This simple mechanism is astonishingly effective.

It fires a shell, of approximately seven pounds equal in effectiveness to that of the 75-mm gun, to a maximum range of 3300 yards. Its probable error, in range, is close to one two hundredths of the range; and in deflection, to one four hundredths of the range. For fire of destruction it fires a shell weighing approximately 14 pounds, to a maximum range of 1300 yards. The following extract from the Report of the Field Artillery Board gives a good illustration of the effectiveness of this 14-pound shell:

"One of this type of shell, with a delayed fuze, penetrated the roof of a dugout made of two layers of four to five inch logs separated by fourteen inches of earth; burst inside; and blew off a large portion of the roof, breaking several logs and throwing others fifteen feet or so into the air."

While both types of shells may be armed with either the instantaneous or the delayed fuze, it is probable that the light shell with the instantaneous fuze will be used against personnel, and the heavy shell with the delayed fuze against materiel.

In contrast to the old mortar the Stokes-Brandt is equipped with an accurate sight. This sight permits the choice of an aiming point at almost any angle from the line of fire and combines in its construction a mil scale and a level dial for verifying elevation.

The barrel, base plate, and bipod each weigh about 40

pounds. Their total weight is a little greater than that of the 3-inch Trench Mortar. It is much more rapidly and easily put into action, however, as the base plate usually does not have to be dug in before firing but can simply be laid upon the ground. An arrangement of strongly braced ribs and a spade on the under side of the base plate ordinarily insures sufficient stability although it is desirable to dig the plate in when firing the heavy ammunition or when firing for a long period of time from one position. When there is no need for a base plate pit the mortar can be mounted for firing very rapidly. In tests this has been done from carts in from 1 to 2 minutes, with time taken from the initial command to the instant the first round was fired.

A very definite improvement in the Stokes-Brandt Mortar over the 3-inch Mortar is that the barrel of the Stokes-Brandt can be attached to the base plate. The base cap, or lower extremity of the barrel, terminates in a spherical head. Two opposing sides of this head have been machined off so that it has, opposite each other, two flat surfaces. The base plate contains three sockets of a size to fit the flat surfaces on the base cap head. These sockets are provided with lugs for locking the base cap head to the base plate. When it is desired to attach the mortar to the base plate, the spherical head of the base cap is inserted into one of the sockets and given a ¼ turn, which locks them together.

Another improvement is in the firing pin. This pin projects into the chamber only 1.5 inches, thereby reducing the number of misfires experienced with the old 3-inch Mortar from bent firing pins.

The traversing and elevating mechanism is similar to that of the old 3-inch trench mortar. The traversing screw provides a maximum traverse of from 130 to 210 mils, depending on the elevation of the barrel. The mortar is easily laid upon new targets beyond the limits of this traverse however, for, as no base plate emplacement is required, it is necessary only to move the bipod and base plate so as to point the barrel in the new direction of fire.

With the Stokes-Brandt, the traversing screw can be

brought to the horizontal by means of a movable device attached to the left leg of the bipod, without changing the positions of the legs, which was necessary with the old model whenever the bipod was set up on uneven ground. Reference to a level dial incorporated in the sight verifies this cross leveling, a necessity for accurate adjustment of fire.

The barrel is attached to the bipod through a double acting disconnector with a spring which allows the tube to recoil and return to battery without carrying the bipod with it. This gives increased accuracy of fire and, moreover, permits the sight to remain attached to the mortar during firing.

The mortar is laid for elevation in the same manner as the 3-inch Trench Mortar, except that elevation is verified by reference to the sight instead of a clinometer. A metal plate carrying the fire control tables is permanently attached to the barrel, thus insuring their presence at all times.

The shell is bi-ogival (the shape of an elongated egg the large end being the front) and at the rear it has a perforated tube to receive the cartridge propellant. To this perforated tube fins are soldered which impart stability in flight. The propellant consists of a cartridge similar in appearance to a shotgun cartridge and, also, from one to six power increments. The power increments are small packets that are inserted between the fins in spaces provided for that purpose.

This weapon has been adopted so recently that there are no regulations yet governing its drill and technique; nor are there authoritative pronouncements governing its tactical employment. Consequently, the following speculations are based only on the characteristics of the mortar as demonstrated in technical tests and experiments.

From its characteristics, it may be expected that the employment of this weapon will affect the employment of the 37-mm gun. The double mission of engaging both ground targets and tanks, has given the 37-mm gun a difficult task. Tanks must be engaged by direct laying, requiring exposed gun positions readily disclosed to the

enemy at the first firing. If the gun is initially placed in defilade, precious seconds are lost in moving forward to engage a tank attack. The new mortar, however, can engage ground targets as effectively as the 37-mm gun. It has the accuracy and range to engage definitely located point targets and can cover an area beyond the capabilities of the 37-mm gun. While its ammunition is heavier than that of the 37-mm it is also, round for round, much more effective. Although, from the viewpoint of weight and bulk, supply will probably be more difficult, there is a compensating factor in that, because of its high angle fire, the mortar can be placed in protected positions that facilitate ammunition supply. It follows, therefore, that the 37-mm gun can, when necessary, be released from its old mission of engaging point targets and assigned solely to the mission of tank defense.

In the absence of service tests, it is difficult to say to what extent the fire of this mortar can replace the fire of the 75-mm field artillery piece. At least, with its adoption, there will be less necessity for calling upon the field artillery for an accompanying gun, for the desirable characteristics, except tank defense, of such a weapon are included in this infantry battalion weapon.

In the Field Artillery Journal of July-August, 1933, Major Louis E. Hibbs, F.A., comments as follows:

"They (the infantry) have long asked for an accompanying gun and our artillery service has been searching for something with which to answer the demand. Here is a weapon almost ideally suited for this work; light, powerful, of high mobility and low vulnerability, accurate and of sufficient range, and promising an ease of ammunition supply far beyond anything so far developed."

During the progress of the attack, the battalion commander will probably rely in the main upon the fire of his mortar or mortars, for engaging unforeseen targets. The difficulty of the artillery in affording such supporting fires is aptly summarized in the following: "Due to the fallibility of telephone line and radio and the constant movement of command posts and switchboards, there is no assured continuous communication to the supporting

artillery. Observation of the target by the supporting artillery may be impaired by poor visibility or the target may be invisible from the supporting artillery's observation posts. Target designation is extremely difficult, and effectiveness of fire suffers from inaccuracy due to long ranges. Moreover, the supporting artillery's information is received by word of mouth, second or third hand in most cases, and due to the inherent delay of transmission of such information, there is a lag in the information in the possession of the supporting artillery. These factors contribute to reduce efficiency of the supporting artillery when compared with that which might be obtained by a weapon of the same power in possession of the infantry and normally situated within the area occupied by the front-line troops." (Report of the Field Artillery Board.)

The Stokes-Brandt 81-mm Mortar brings under control of the battalion commander a powerful and flexible weapon. It can fire from practically any position into any position. Its fire extends from 150 to 3300 yards. It is sufficiently accurate to engage point targets and its ammunition has an effective radius wide enough to cover area targets. It can rapidly be placed in action, quickly shifted in direction to engage any target, and fired at a maximum rate of 30 to 35 rounds a minute. It brings the power of the artillery to the control of the infantry commander.

CHAPTER V

Historical Map Problem

OPERATIONS OF A BATTALION OF FRENCH INFANTRY IN THE VOSGES MOUNTAINS ON AUGUST 9, 1914

GENERAL SITUATION

On August 9, 1914, the French and German armies were still mobilizing under cover of their frontier forces. From the declaration of hostilities until that gigantic meeting engagement on August 22, known as the Battle of the Frontiers, the covering forces of these two belligerents clashed again and again in small, isolated actions. It is one of these small, preliminary encounters that we shall follow today.

FIRST SPECIAL SITUATION

(See Special Map, opposite this page.) The night 8-9 August, 1914, a regiment of French Infantry bivouacked in the little village of Crois-aux-Mines (off map to S.W.), which nestles at the foot of the Vosges Mountains close to the Franco-German frontier. The strength of this regiment has been greatly increased during the past week by the addition of reservists who bring the four-platoon companies to about 250 men. The regiment has been garrisoned in this locality for several years. Both officers and men are familiar with the rugged and heavily wooded Vosges Mountains that look down on the lost French provinces of Alsace and Lorraine.

About 7:00 AM 9 August the regiment gets orders to cross the Vosges Mountains in the vicinity of the Saint Marie Pass and seize the little town of Markirch on the German side of the frontier. Higher headquarters has no definite knowledge of the enemy in this locality but believes that the regiment will encounter no serious resistance in accomplishing its mission, no more than a few hostile patrols at the most. This impression is trans-

mitted throughout the channels of command and filters down to the ranks.

At 7:30 AM the regiment moves out of Croix-aux-Mines with the village of Wisembach as its first objective. The 1st Battalion, designated as advance guard, sends out the 4th Company as advance party and support. The column winds along the great highway that runs through the Saint Marie Pass. The road climbs endlessly and the heavily-loaded soldiers welcome the hourly halts.

The advance guard reaches Wisembach without incident and halts on the far side of the town. Here the battalion commander joins the captain of the 4th Company and issues, in substance, the following orders:

"Your company continues as support of the advance guard. You will leave the highway here and follow the ravine which runs northeast from Wisembach to the line of crests along the frontier. You will then cross the divide and take up a position on the military crest of the hill that dominates Markirch xxxx."

The captain of the 4th Company moves out with his unit in this formation:

The 1st Platoon, leading, marches in line of section columns (each section in column of squads). The platoon is preceded by a line of scouts at about 150 meters.

The other three platoons follow at 200 meters in line of platoon columns (each platoon in column of squads).

Two patrols of four men each are sent to the flanks along the steep, heavily-wooded banks of the ravine.

The company commander and his runners march about 150 paces behind the 1st platoon.

The march is slow, owing to the formation, the difficulty of negotiating the woods, and to the badly accidented and sharply rising terrain. Finally the head of the ravine (Point Y) is reached and there the captain halts the company. This halt is necessary for several reasons. First, the men need to blow after their climb; second, contact must be regained with the patrols on the flanks and the line of scouts to the front; third, the company has become somewhat disorganized and must be gotten in hand; and fourth, the Captain is not altogether

certain of his location and must orient himself.

While his lieutenants round up the company, the captain studies his map. It is difficult to read. The contours in this locality are literally piled one on the other. After considerable study the company commander orients himself. He decides that the hill he has been ordered to reach (Hill A) lies southeast of his present position.

The company having been regrouped and the men having somewhat regained their breath, they move off to the southeast in the same formation. The 1st Platoon has covered about 300 meters when the captain sees signs of excitement among the men ahead. The platoon wavers to a halt. Not a sound disturbs the quiet of the heavily wooded mountain. The captain wonders what can be causing this excitement—this unauthorized halt.

He calls to his runners to follow him and starts forward at a run. He comes up with the lieutenant of the 1st Platoon. Panting and out of breath, he gasps at the lieutenant "Qu'est-ce qu'il y a donc?" (What's the matter, anyway?)

The lieutenant points to the front and answers simply "Regardez-la, mon capitain!" The captain looks: There, sprawled before the platoon, are a number of dead French chasseurs. The captain examines their insignia. These dead men had belonged to a strange unit. What had these chasseurs been doing here? Where had they come from? Where had the survivors gone? Why hadn't he been told of this encounter? These questions race through the captain's mind, but he can find no answer to them.

He moves about studying the disposition of the bodies. He comes to these conclusions:

(1) These chasseurs had been marching in the same direction that his unit is now following.

(2) From the disposition of the bodies, it appears that they had been marching in the same relatively dense formation that his company is in at this moment.

(3) From the way the men had fallen, it appears that they had been ambushed.

FIRST REQUIREMENT.—The actions taken and orders, if any, actually issued by the company commander at this time.

(*NOTE.*—The historical solution and a discussion will appear later.)

SECOND SPECIAL SITUATION.—Let us now turn to the remainder of the battalion, which constitutes the reserve of the advance guard. As we have seen, the going had been difficult and slow for the 4th Company; it was even slower for this larger body of troops with the result that the distance between the support and the reserve gradually increases.

The battalion, puffing and blowing, is still toiling up the ravine. The hot August sun beats down on the marching column. Officers and men alike will be glad to have this day's march behind them.

As the head of the battalion reaches the point marked X on the map, a breathless runner dashes along the column shouting for the major. He is quickly led to the battalion commander to whom he hands a hastily scribbled message, in substance, as follows:

"Have found many dead soldiers of the X Battalion of Light Infantry in the woods about 800 meters S.E. of the head of the ravine. I am continuing the advance with all possible precautions."

The major turns to the panting messenger and asks him, "How many dead soldiers did you see there, my boy?"

The runner replies, "Hundreds, sir, hundreds! The woods were full of them."

Before the major has time for a second question, he hears a sudden burst of rifle fire far up to the front. He listens intently. The volume of fire increases moment by moment. Suddenly, above the distant crackle of rifle fire, rises a thrilling French bugle call—the charge! The rifle fire doubles in intensity. A few moments pass and again come the far clear notes of the charge—but this time the call is not completed. Again the sound of firing mounts to a furious pitch. Then bit by bit it dies down.

The battalion still plods up the ravine. The major, the battalion officers, the men, all wonder what has happened. What does this sudden diminution in fire mean? Has the enemy been driven off? Has our advance guard been defeated? What shall we do?

Suddenly a French soldier comes racing down the ravine. He is hatless; his pack is gone; he carries no rifle. One arm hangs limp. His face is splashed with blood.

Eager hands reach out to support him. Questions are volleyed at him. He gasps out: "All officers killed—company annihiliated." He is led to the battalion commander.

The major questions him. "Now, calm down, son, and tell me just what happened." The soldier speaks in broken sentences—his face is drawn with pain. "Marching through the woods— Germans ambushed us—all officers killed—company wiped out."

The major cocks an ear to the front. There are still sounds of desultory fire. His battalion has now reached Point Y.

SECOND REQUIREMENT.—Actions taken and orders, if any, actually issued by the battalion commander.

(The historical solution will be disclosed later.)

FIRST SPECIAL SITUATION, CONTINUED.—Returning to the point at which we left the 4th Company we find that the company commander takes the following action:

(1) He acquaints leaders of the 2d, 3d, and 4th Platoons with the situation, directs them to move their units behind a fold in the ground (about 400 meters northwest of Hill A), and there to await further orders.

(2) He directs the lieutenant of the leading platoon to deploy his platoon as skirmishers and continue the advance, covering his movement by patrols to the front and flanks. He warns him to take every precaution.

(3) He informs all four platoons that he will march about 150 meters in rear of the 1st Platoon.

(4) He sends a message to the battalion commander briefy relating the incident.

The 1st Platoon advances as ordered. The forest through which they now move consists chiefly of full grown pines which, although permitting relatively easy passage, limit vision to about 100 yards. Contact with the patrols is almost immediately lost but the advance continues for some hundreds of yards. Suddenly and without even the remotest warning, the silence of the forest is shattered by a volley of rifle fire. A runner drops at the captain's side mortally wounded. Men in the 1st Platoon are mowed down as if by an invisible scythe.

How did this happen? What became of the patrols that were ordered to cover the march? The answer is obvious. In the forest without compasses and without landmarks or prominent terrain features to guide on, they lost direction. The patrols had obliqued to the right and left, lost contact with the platoon, and uncovered its front.

The captain now works his way up to the platoon leader. "Where is the enemy?" he asks. The lieutenant replies, "I haven't the slightest idea," and this is absolutely true. Although a hail of bullets continues to beat about the platoon, there is no evidence or indication of the source. Minutes pass before the two officers make out flashes of rifle fire about 80 yards to their front.

The captain now directs the lieutenant to have his platoon open fire and then, after several minutes of this preparation, to carry the hostile position at the point of the bayonet.

The platoon opens a brisk fire and then, as the bugle blows the charge, leaps up and rushes forward with shouts of "Vive la France". It is stopped almost in its tracks. Again the bugler blows and again the red-pantalooned Frenchmen, led by their white-gloved lieutenant, try to advance. The platoon is cut to pieces. The lieutenant is killed. No ground is gained.

THIRD REQUIREMENT.—Actions taken and orders, if any, actually issued by the company commander at this time.

SITUATION, CONTINUED.—The company commander sees that the platoon is unable to advance and notes that

its casualties are heavy. He now decides to prolong the firing line to the right and the left. He sends for his three remaining platoon leaders. He describes the situation to them. He then orders the 2d Platoon to extend the line to the right and the 3d Platoon to the left. He directs the platoon leaders to move their units into position by the advance of successive fractions. The 4th Platoon he holds out as reserve, despite the French regulation in effect at this time which contemplated the complete commitment of the advance guard.

Shortly after this the battalion commander joins the captain. The major has narrowly escaped death—a bullet has knocked off his cap.

The company commander explains the situation. He states that he has three platoons in action but that the enemy's flanks still remain unlocated. He tells the major that efforts to advance have been productive of nothing save heavy casualties. He explains that lateral liaison is almost impossible owing to the accuracy of the enemy's fire and the density of the wood. Each of these three front-line platoons is more or less fighting on its own.

The battalion commander now states that he is going to commit the rest of the battalion and extend the line to the right and left. He tells the captain that the 4th Company will be relieved as soon as possible and will pass to battalion reserve. He cautions the captain to hold where he is until further orders. With that the battalion commander leaves.

By this time the firing line has conformed fairly well to the terrain. Firing is spasmodic. Neither side shoots unless a target is seen. Time passes—to the company commander it seems endless. Occasionally there is a cry as some Frenchman is struck. Two soldiers nearby have taken cover behind trees. The Germans spot them. The Mauser bullets rip through the soft pine trunks and two more names will appear on the French casualty list.

Now the men of the 4th Company hear new firing on their flanks. Is it French or German? Gradually the sounds of this firing extend further to the left and right. The rest of the battalion has come up!

The company commander now tries to contact these fresh units but the men he sends out do not return. No information comes. What is happening? He sends runner after runner to find the battalion commander and ask for information. They do not return.

Time drags on. The 4th Platoon is still in reserve to the rear. The front-line platoons have suffered heavily. It is impossible to evacuate many of the wounded. Casualties are still occurring. Is the front line strong enough to hold if the Germans should decide to attack? Should he bolster up the firing line with his last platoon?

While the company commander ponders this question, a runner dashes up with a message from the battalion commander. It reads, in substance, as follows:

"You will break off contact with the enemy at once, withdraw to the depression about 400 meters in rear of your present position, reorganize your company and pass into battalion reserve."

It is broad daylight. The enemy is between 60 and 80 meters to the front. The company commander has no information of the units on his right and left.

FOURTH REQUIREMENT.—The actions taken and orders, if any, actually issued by the captain commanding the 4th Company.

DISCUSSION

The captain of the 4th Company was faced with several difficult situations on this, his first day of combat. We may theorize and point out errors in the academic quiet of the school room, but what would we have accomplished in this harassed captain's position? Let us, then, review this isolated little action from the vantage point of twenty years, bearing in mind that we cannot recreate the shocks, the surprises, and the tumultuous impressions of combat that the actual participants so gallantly withstood.

FIRST REQUIREMENT

"Dead men tell no tales" is a time honored adage, but on that quiet August morning of 1914 dead men spoke

to the captain of the 4th Company with unmistakable clearness. They told a tale of ambush and sudden death. Each corpse shouted a warning that the French captain heard and understood. The hill he had been ordered to reach was not far away. His mission, as support commander, was to clear the way for the reserve. At the same time he had to protect himself. The country was mountainous and heavily wooded. Under such conditions, the ordinary difficulties of maintaining direction and control are magnified out of all proportion. The threat of a German ambush complicated matters still further.

Today we would move forward under the protection of scouts. First we would establish the general rule that intervals and distances between adjacent pairs of scouts, between scouts and the unit following them, and between adjacent units or elements, must be slightly less than the limit of visibility. Next we would have scouts, working in pairs, precede and cover the advance. We would designate one pair of scouts as the base pair and detail an officer, trained in the use of map and compass, to march with this pair. All other scouts would then conform to the base pair or to the pair on the side toward the base pair.

In this situation, the remainder of the leading platoon should have been broken up into squad columns, each squad following its pair of scouts at slightly less than the limit of visibility. It is believed that the company commander was correct in halting his other three platoons under cover. It is presumed that he intended to advance them by bounds as the leading platoon cleared the way. It would have been equally correct for these three platoons to have followed the leading platoon in squad, section, or platoon columns depending on the estimated danger of surprise. This formation might well have been used when the company left the road at Wisembach.

The company commander was correct in providing patrols for flank protection as soon as he left the highway at Wisembach. However, he should have prescribed some special arrangements whereby these patrols could maintain contact with the company, otherwise they might easily

lose direction in the woods and fail in their security mission.

In woods there is a tendency to hold units in a close formation for the sake of control. However, the danger of suffering heavy losses from surprise fire is so great that a certain degree of control must be sacrificed in the interests of safety and a partially deployed formation, such as that described, taken up.

SECOND REQUIREMENT

It is difficut to imagine what thoughts raced through the battalion commander's mind when he heard the violent fusillade break out to his front. This move to Markirch was to be a march and nothing more and yet, from the intensity of fire, he could tell that his 4th Company was engaged in a bitter struggle somewhere off in the woods. We cannot tell how he interpreted the gradual diminution of the fire—whether he believed it to mean victory or defeat. This we do know—he was a hard-headed individual who refused to accept tales of disaster without personal investigation and verification.

In combat the wounded man, the straggler, and the runaway usually paint a dismal picture of annihilation and relate a harrowing "last survivor" story. Such was the tale this wounded Frenchman brought to his battalion commander. The major, quite correctly, kept his head and refused to believe this improbable story of calamity. He decided, also quite correctly, that the best way to find out what was happening was to go forward and see the captain of the 4th Company.

Before leaving, he should have provided all round protection for his battalion. Located in a ravine, with a dense forest limiting visibility on all sides, the battalion might easily have been destroyed by a surprise attack from almost any direction.

In his move forward, the battalion commander would have done well to provide himself with an escort of a squad or section to guard against capture. He ran little chance of losing his way in the woods as he had only to march to the sound of the firing.

THIRD REQUIREMENT

When the German fire suddenly crashed into the leading platoon the company commander was again forced to make a decision. French regulations stated unequivocally that when the enemy was encountered in woods he would immediately be charged with the bayonet—there would be no rifle fire. In this situation such action appeared impossible. The Germans were intrenched; their position was almost invisible. The captain temporized; he ordered a brief preparatory fire and then an assault. The assault was stopped in its tracks.

Again the situation called for a decision. The leading platoon was unable to advance. Its losses were heavy. His remaining three platoons had not been committed. He had received no word from the rest of the battalion, in fact, he didn't know where it was. Regulations stated that he should commit his entire force. Finally, his mission as support commander involved three things: first, to clear the way of small hostile forces; second, if the enemy was encountered on the defensive, to determine, as far as possible, his strength and dispositions; and third, if the enemy acted aggressively and appeared to be superior, to gain the necessary time for the reserve of the advance guard to get into action.

Taking all these factors into consideration, he decided to prolong the line with his second and third platoons and to hold out the fourth platoon to meet unexpected developments or to extend the line still further if the three other platoons proved insufficient to determine the extent of the hostile position.

It is believed that this action was correct. The enemy had been found on the defensive; consequently the support commander should seek:

1. To determine the extent of the hostile position.

2. To overlap the enemy and force him out if he is not strong enough to prevent such a maneuver.

3. To gain information of the hostile strength and dispositions if the enemy proves to be superior in combat strength to the support.

In most situations the entire support should be promptly committed. Here, because of the limited visibility, the fact that the enemy may at any moment strike the company in flank with other forces, and, finally, the unusual strength of the company—250 men—it is believed that the support commander was entirely justified in holding out one platoon as a reserve.

FOURTH REQUIREMENT

Probably the most difficult problem that confronted this French captain on Augut 9, 1914, was to comply with the order to effect a daylight withdrawal while engaged with an aggressive enemy only 60 to 80 yards away. Such a withdrawal is, almost invariably, far more disastrous than hanging on to the position until nightfall and then withdrawing under cover of darkness. However, the captain of the 4th Company had no choice; his orders were definite. His problem was to withdraw in such a manner as to lose as few men as possible. It was by no means a simple operation.

The terrain was so close and the visibility so restricted that it was impossible to have one platoon cover the withdrawal of its neighbor by fire. Not even the fourth platoon, which had not been committed, could aid materially in such an operation. One squad might have been able to cover the withdrawal of an adjacent squad but even that was doubtful. The German fire was heavy and accurate, the hostile rifleman could not be definitely located, and finally the action required was complicated, requiring detailed plans that would have to be communicated to each squad. This last factor in itself was sufficient to condemn the plan because every move brought a burst of accurate fire from the well concealed Germans.

The simplest plan seems to have been the one adopted by the company commander. He had the word passed along the line from soldier to soldier to fall back individually and rally in the little depression about 400 meters in rear of their present position. To quote the captain "This movement was long and difficult to execute and cost us still more casualties. We had trouble in

falling back and there was considerable disorder, but thanks to the devotion and the energy of my noncommissioned officers, the larger part of the company was finally regrouped in a little depression about 400 meters to the rear. Stragglers joined us bit by bit. The wounded were carried to shelter."

CONCLUSION

Shortly after the company withdrew, the Germans, believing the French were demoralized, launched a counterattack. This was repulsed with the bayonet and, according to the French account, with heavy loss to the enemy.

That night, under cover of darkness, the regiment broke off contact and withdrew to Wisembach.

It was subsequently learned that this French regiment had been engaged with the German chasseurs (light infantry) of Selestat who had fortified this part of the frontier. The Germans had dug trenches along the crests without parapet and had so skillfully camouflaged them that it was only through flashes of rifle fire that their position was picked up.

To quote the French captain again—"The German losses were not heavy except in the counterattack, for the Germans had been well sheltered. On the other hand, our regiment suffered severely. The casualties in my company alone amounted to eighty, among them five officers.

"I have never been able to explain why no one informed us of the battalion of light infantry that had already run into these trenches. Only the lines of dead soldiers warned me of the danger of maintaining the dense formation we were marching in at the time."

NOTE.—This problem is based on an article by Colonel Etienne in the February 1925 number of the French Infantry Review. For the purposes of continuity, clarity, and instruction, several minor assumptions, that do not affect the basic veracity of the narrative, had to be made. The unit involved in this action remained anonymous in the original article.

CHAPTER VI

Regiment In Defense

MAP PROBLEM

The purpose of this problem is to show the necessity of evaluating terrain and to bring out some of the questions that must be answered by a commander while making his reconnaissance and formulating his plan of defense. The map used is Special Map No 11, Fort Benning, 1:20,000. (Inclosed in pocket in back cover of this volume.)

SITUATION

Blue forces are making a general advance from the east. The Blue left flank division, advancing on Fort Benning generally along the 1st Division Road, has been opposed by weak Red resistance.

At 11:00 AM the Blues learned that additional Red forces were advancing from the west and southwest.

The Blue division commander ordered his forces to stop the advance and to defend, occupying in general their present positions.

At this time the forward elements of the division have reached the general line BM 303—Santa Fe Road— Davidson Hill—Hawkinson Hill. The 1st Infantry (less 3d Battalion and 3d Platoon Howitzer Company in brigade reserve) is moving into an assembly position in the draw south of Sackett Hill. The 1st Battalion, as a result of casualties, is about five per cent below strength. The 2d Battalion has not been engaged and is full strength.

Colonel "1st Infantry", upon reporting at Davidson Hill to Brigadier General "1st Brigade" at 12:30 PM, received the brigade order, extracts of which were:

* * * *

A large enemy force is advancing from the west and southwest. It is estimated that they can attack this position by daylight tomorrow.

The division stops its attack and defends along a line extending roughly north and south through this point; brigades abreast, 2d Brigade on the right.

* * * *

The 1st Brigade will defend the left (south) sector with regiments abreast. The 1st Infantry will defend the right (north) sector and will insure the retention of Holliday Hill.

Main line of resistance: Davis Hill—Davidson Hill—Hawkinson Hill.

Regimental reserve line: Strickland Ridge — Holliday Hill—Lambert Hill.

Boundaries, and limiting points for regimental sector as shown on special map.

The troops now occupying the sector assigned the 1st Infantry are to be withdrawn to division reserve.

* * * *

The 1st Battalion 1st Field Artillery will support the 1st Infantry.

On hearing the order, Colonel "1st Infantry", sent a message to his battalion commanders to report to him at Holliday Hill at 1:30 PM. Then, with his S-2, S-3, and orderlies, he reconnoitered his defense area.

From Davidson Hill he observed the area to the front and around the left limiting point on the main line of resistance.

From Davis Hill he studied the ground west and north of that hill. He then returned to Holliday Hill, completing the formulation of his plan on the way, and gave his defense order to his battalion commanders.

During his reconnaissance and study of the 1st Infantry area, Colonel "1st Infantry" sought the answers to certain questions concerning the enemy and the terrain. His plan of defense, a necessary part of his order to his regiment, was based upon the conclusions reached after answering these questions.

FIRST REQUIREMENT.—The answers which you, as Colonel "1st Infantry", would have made to the following questions:

(1) What is the most probable avenue of attack against the brigade area?

(2) What are the most probable avenues of attack against the 1st Infantry area?

(3) How may we expect the enemy to use his supporting fires (artillery and machine guns)? What positions would he select and what sectors of fire would he assign for his machine guns?

(4) What are the key terrain features in the 1st Infantry sector? Discuss their relationship to one another and to terrain features in adjacent sectors.

(5) Is the ground between the main line of resistance and the regimental reserve line suitable for organization in depth? Would it be better in organizing the sector for defense, to move the regimental reserve line forward?

(6) Should the regimental commander employ one, or two, battalions on the main line of resistance? What are the advantages and disadvantages of each plan?

(7) Where should the artillery place the bulk of its fires for the close-in defense of the main line of resistance? Where should they place these fires for the defense within the regimental area?

(8) In general, what positions and missions should the machine-gun companies be given.

(9) What defensive organization of ground should be prescribed for the regimental reserve?

(10) Where should be the initial location of the regimental reserve?

A SOLUTION AND DISCUSSION OF FIRST REQUIREMENT

(1) In view of the fact that the hostile attack may penetrate the positions of the units on its right or left, it is necessary that the 1st Infantry be so disposed that it can meet an attack from the flanks as well as from the front. In other words, it should organize for "all around defense". The valley of Gilbert Creek is a covered avenue of approach for an enemy attack. It is also a direct route to Green Hill which, because of its observation and command, is a very logical objective for an enemy attack. Therefore Colonel "1st Infantry" must consider this possibility, even though it would take place outside his area of defense; for the capture of Green Hill by the enemy would materially hinder the 1st Infantry in carrying out its assigned mission.

(2) On the 1st Infantry front the wooded draws west and north of Davis Hill are the most suitable places for the enemy to form for attack. While such an attack would undoubtedly include part of the area of the brigade on the north, its immediate objective would probably be Davis Hill.

(3) In an attack up the valley of Gilbert Creek the enemy would no doubt use Bouton, Elliott and Wells Hills for machine-gun positions and artillery observation in order to place fire on Davidson Hill, thus attempting to protect the flank of his troops as they advance up the valley.

In an attack against Davis Hill, Houston Hill affords observation and positions for the enemy to support his attack by direct overhead fire until the attack has reached well up Davis Hill.

(4) The key terrain features within the sector of the 1st Infantry are Davis, Davidson, and Holliday Hills. Possession or control of these hills by the regiment will make the position secure against any possibility of loss. Holliday Hill, on the regimental reserve line, dominates the crests and eastern slopes of both Davis and Davidson Hill if the enemy secured Davis Hill it would place flank-

ing fire on Davidson Hill and attack it in reverse. Therefore the capture of Davis Hill would probably result also in the early capture of Davidson Hill.

Green Hill, in the sector on the south, controls the crest and the southern slopes of Davidson Hill and, to a smaller extent, those of Davis Hill. Friendly troops on Green Hill can assist materially in holding Davidson Hill and can place machine-gun fire on Davis Hill to good advantage. On the other hand, if the enemy secured Green Hill he could use it similarly to a great advantage in capturing Davidson and Davis Hills.

(5) The spur, extending to the southeast of Davis Hill, and Reynolds Hill offer positions for organization in depth. They have some defensive value but are controlled largely by Davis Hill and Davidson Hill. Their defensive strength is very slight if the enemy occupies Davis Hill. They may be classified as weak defensive positions.

The regimental reserve line is rather far from the main line of resistance, but because there are no suitable positions farther forward it should not be moved west of the Old Hickory Trail.

(6) The employment of one battalion in the forward part of the area and one battalion on the regimental reserve line has several advantages over any other disposition of the regiment: greater defensive strength on the regimental reserve line for defending Holliday Hill; an ample force with which to counterattack; fewer men subjected to hostile fires expected on Davis and Davidson Hills; facilitation of relief methods if the regiment has to hold for a long period.

The employment of two battalions, less one company in regimental reserve, has the advantage of providing greater fire power for holding the extensive front; moreover, with the frontage divided between two battalion commanders and their staffs, control would be much simpler.

As Holliday Hill dominates the forward part of the position, and the brigade order specified that the regiment "insure the retention of Holliday Hill", the regimental commander decides it is best to employ only one battalion

forward and place the other on the regimental reserve line. At least two rifle companies would be needed for the close defense of Holliday Hill to insure its retention.

(7) The normal defensive barrages of the artillery should be placed to cover the likely avenues of hostile approach not covered by machine guns and other weapons —in this instance, the wooded draws west of Davis and Davidson Hills.

Plans should be made also to place artillery fires on Davis and Davidson Hills and the draws east of them in the event the enemy penetrates the 1st Infantry sector.

(8) The disposition of the forward battalion machine guns is, of course, a function of the battalion commander. Although it is highly desirable to dispose them in depth throughout the battalion area, here they must be placed farther forward because of the nature of the ground and the lack of positions in depth.

The machine guns of the reserve battalion can support the front-line units by overhead fire from Holliday Hill and should be so employed. These guns should have as their missions to fire upon areas rather than hostile positions, but should remain under control of the reserve battalion commander.

(9) The regimental reserve may be used to defend Holliday Hill against an attack from the west. Again, it may have to defend facing toward the south or the north. The enemy's main effort, for instance, may envelop the south flank of the brigade, passing to the south of Green Hill, and then turn north to attack Holliday Hill from the direction of Lambert and Lee Hills. Therefore the reserve should be ready to meet any threatened attack. It should not only prepare a position facing west on Holliday Hill but also positions on both flanks of that hill, one facing north and the other, south.

(10) If we can foresee definitely where and how the reserve is to be employed it is far better to place it in its positions initially. On the other hand, if this cannot be determined it is better to hold the reserve ready to perform any mission assigned.

Once the attack has commenced, it may prove difficult to move the reserve into its positions on Holliday Hill, but

it would be just as difficult, if not more so, to move it out and assemble it for a counterattack.

The wooded draw south of BM 449 affords a covered assembly position for the reserve. Here the reserve is close to its prepared positions and well located for a movement under cover to positions from which to counter attack.

SITUATION CONTINUED

The enemy attacked at daylight. At 8:00 AM Colonel "1st Infantry", his artillery liaison officer, Lieutenant Colonel "Reserve Battalion" and S-3, are at an observation post on Holliday Hill. The situation, known to all, is as follows:

Davis Hill has just been captured by the enemy. Small groups of enemy riflemen can be seen advancing slowly toward Davidson Hill from the vicinity of the water tanks.

Combat groups on the southern slopes of Davidson Hill are being attacked vigorously from the west and from the southwest.

In the sector of the regiment on the north, the Blues are still occupying positions on Brown Ridge.

In the sector of the regiment on the south, the Blues are holding Green Hill and have just repulsed an attack from the valley of Gilbert Creek. The sound of firing has materially decreased.

Blue artillery is firing in the draw west of Davis Hill and just west of Davidson Hill.

The machine-gun company of the reserve battalion is firing from positions generally on Holliday Hill. Two of its guns have been destroyed.

The howitzer platoon is in position on Holliday Hill near the First Division Road.

The regimental reserve is in its assembly position in the draw south of BM 449.

SECOND REQUIREMENT. — The orders of Colonel "1st Infantry" at 8:00 AM for the employment of the regimental reserve (omitting any administrative details).

A SOLUTION OF THE SECOND REQUIREMENT

At 8:00 AM, Colonel "1st Infantry", at his regimental observation post on Holliday Hill, issues the following oral order to Lieutenant Colonel "Reserve Battalion":

> "Occupy your positions facing west on Holliday Hill at once. Have the machine guns protect the right of troops on Davidson Hill by fire on Davis Hill."

To "Artillery Liaison Officer":

> "Have the artillery battalion place all its fire in draws west and southwest of Davidson Hill at once."

To "S-3":

> "Inform the battalion on our left of the situation, and request machine-gun support by fire on Davis Hill."

DISCUSSION

As soon as the plan of defense has been adopted the commander must prepare tentative plans for employing his reserve. He bases these plans upon hypothetical enemy successes. One such plan might very well be made to meet the situation preceding the second requirement.

The question then to be answered by Colonel "1st Infantry" is: "Should I counterattack to recapture Davis Hill?" The reserve is well located to launch such a counterattack. Using the line of the Marne Road as a line of departure and receiving the support of artillery fire and the machine guns now on Holliday Hill, it has a reasonable chance of success. However, the attack of the enemy has not yet been stopped. Using up the reserve to counterattack may seriously jeopardize the holding of Holliday Hill. Under these circumstances it is probably better for the reserve to occupy their prepared positions on Holliday Hill than to counterattack against an enemy still in motion.

As the enemy has captured Davis Hill and is in a favorable position to attack Davidson Hill, should the regimental commander withdraw the troops remaining on Davidson Hill to make his defense entirely in the prepared positions on Holliday Hill?

To withdraw the troops from Davidson Hill for that purpose would be to defend a line rather than an area. This would be objectionable because it would not compel the enemy to divert troops from his forward drive to widen the breach he has made. The troops left on Davidson Hill would cause the enemy to divert some of his troops and fire power from the attack on Holliday Hill and, by causing him casualties and slowing up his attack, would materially assist in the defense of that hill.

The troops left on Davidson Hill should be supported with the maximum fire power available. The machine guns on the regimental reserve line, by fire on Davis Hill, can protect to a great extent the right of the troops on Davidson Hill. Such machine-gun fire is of course flanking fire and all the more desirable.

All of the artillery should be employed where it can best assist the troops on Davidson Hill. In this case it is believed that it should all place fire in the draws west of Davidson Hill.

Though the regimental commander has no control over the friendly units on Green Hill he should here seek aid from the battalion occupying Green Hill. These units are not now heavily engaged and can assist greatly by fire on Davis Hill. Such cooperation is not only desirable but necessary on the battlefield.

CHAPTER VII

Can We Shoot Down the Low-Flying Attack Plane?

HISTORY ANSWERS, "YES"; GROUND TROOPS HAVE BEEN WINGING THEM SINCE 1911.

Modern antiaircraft training of infantry is based on these three premises: (1) ground troops will shoot at attacking planes; (2) the rifle or machine gun can bring down planes that come within range; (3) the casualties from the fire of troops well trained in antiaircraft firing may reduce the enemy's air forces so greatly that his production of attack planes will not keep up with his losses, bringing him to the decision that the low-flying attack is too costly. Whether these premises are correct is still debated, although their historical foundation is firm.

This account shows first that many planes have been shot down by infantry fire in the past twenty years. It also shows that principal powers, on two occasions during the World War, decided to conserve their air forces by ordering a cessation of ground attacks because their losses in these attacks, combined with other air losses, had been greater than they could afford.

The historical examples that follow were gathered from approximately one hundred and fifty volumes in The Infantry School Library. These references happened to include fairly detailed and full accounts of only the British air losses resulting from hostile infantry antiaircraft fire. The British authorities have caused to be written as a part of the official history of the war, two excellent books on the role their air forces played. One is *The War in The Air*, begun by the late Sir Walter Raleigh and now being completed by Mr. H. A. Jones. The other is *The Australian Flying Corps in the Western and Eastern Theaters of War, 1914-1918*, by Mr. F. M. Cutlack. Both books are packed with facts valuable to the present discussion although they frequently lack details that would have permitted clearer understanding of the kind

of antiaircraft fire that destroyed certain airplanes. Both of these books are written with restraint and accuracy. They do not skim over the failures and weaknesses of the early fighting aircraft.

The accounts of losses to the air forces of the armies of the other powers were found to be vague and scant for the most part. Hence the history embodied in this paper is far from being the complete narrative of the fight of ground troops against the hated, low-flying plane that may some day be written. Nevertheless, enough historical examples are included herein to indicate clearly that conditions were similar in all armies.

There are hundreds, if not thousands, of references to the effect of ground fire on aviation scattered through volumes of World War history, newspaper accounts, and official dispatches and bulletins. Very few of them, however, are clear and detailed. More often than not the type of ground fire is not specified. The reader has no way of knowing whether antiaircraft gun fire or infantry rifle or machine gun fire was the cause of bringing down a given plane. In many instances it is even impossible to tell from an account whether a plane was shot down by ground fire or by plane. Again, thick volumes recounting the World War history of certain divisions and corps are so bulging with discussion of greater strategy that their authors omit any reference to the important, if minor, infantry-airplane aspect of the struggle. Some high commanders, in fact, do not even mention an airplane!

One general who did mention them was Von Kluck who, indeed, had excellent reason to. When he learned that an airplane reconnaissance had been the means of disclosing to the French his wide turning movement in 1914, he said: "The airplane has destroyed the art of strategy".

In this short history, all records in which there is an inherent or expressed doubt as to the kind of ground fire that accounted for a plane are omitted. For all of the one hundred odd instances cited herein of airplanes brought down by rifle and machine gun fire there is clear evidence to that effect in different references.

Italians First to Use The Airplane in War

The first nation to employ an airplane in actual war was Italy. In 1911, the Italian army sent a plane and pilot to Tripoli for experimental observation use in the Libyan Campaign then in progress against a number of unruly tribes. The reports of hostile movements obtained in the first flights over the enemy proved the military value of the plane beyond question. But unfortunately, after a few days Lieutenant Manzini, the pilot, and his aerial vehicle crashed to the ground when Manzini was mortally wounded in mid-air by a bullet from a native rifle.

During the Balkan troubles that came soon afterward and just before the World War, the Greek army employed aviators. The records indicate a story of continued mechanical difficulties rather than of tactical successes. Apparently these planes rose from the ground so infrequently that they ran little risk of being shot down.

Planes Brought Down Early In World War

Airplanes entered the scene of the Great War very soon after its beginning. They were used at first entirely for observation and artillery spotting. The increased accuracy that artillery gained by their aid at once made the planes the targets of heavy fire from the enemy ground troops over which they flew. Major General Sir F. H. Sykes, at one time chief of the British air staff, says in *Aviation In Peace and War*: "We managed to bring down a number of German machines, mainly by rifle fire. Five had already been brought down by September 7 (1914)."

Captain R. S. Wortley in *Letters From A Flying Officer* recounts as early as August 23, 1914: "The Flying Corps has had its first taste of war. So far everything has been in the nature of a most exhilarating picnic: but yesterday, one of our observers was wounded in the leg by a German bullet: and worse still, one of the machines of No. 5 Squadron failed to return from patrol. The pilot and observer have been written off as missing." The missing

airplane contained Lieutenants V. Waterfall and C. G. Bayly, the first British Flying officers to be shot down by the Germans. Their capture was probably the first substantial information that the Germans received of the presence of British forces in the field against them.

These early planes contained no weapons except such small arms as the flyers chose to take with them into the air. At first hostile pilots paid no attention to each other but went unconcerned about their reconnaissance missions, even waving a greeting when they happened to pass close. But before the end of 1914 we have an authentic account of a plane brought down by the rifle fire of a hostile airman and another account in which pistol fire from a British flyer stopped a German engine and forced the plane to land. These were exceptional instances, however. It was the ground fire from the rifles and machine guns of hostile infantry that all pilots knew was an ever present danger when they dipped too close to troops.

Troops Shoot First: Look Afterward

Indeed ground troops from the beginning showed little disposition to find out whether low-flying planes were friendly or hostile. Quoting again from Captain Wortley's excellent little volume: "August 22 (1914) . . . . Our Allies seem very suspicious of our aeroplanes: in fact, we seem to arouse suspicions everywhere we go! Hardly a day passes but our machines are shot at from the ground . . . not only by French sentries, but by our own infantry as well. One of our flight commanders tells how he was greeted with a terrific roar of musketry as he flew over a British column marching up the road to Mons. After that the night was spent in painting the Union Jack on the underside of the lower wings!"

It was fully this early in the War, too, that the possibly apocryphal difficulties between the aviators and their own cooks took place. At some cost to mess efficiency pilots and observers equipped themselves with stove lids to sit on.

Aerial Casualties Increase

The World War's second calendar year, with its rapid increase in the numbers of planes used by all the powers, saw the loss of several British planes from ground fire. On March 10, 1915, Captain G. I. Carmichael of No. 5 Squadron, 2nd Wing, R. F. C., received a bullet in the engine of his plane while engaged in observing the German lines. He was flying at an altitude of 120 feet. As he turned toward home his engine, missing badly, finally failed. He was near enough to his airdrome, however, to land safely. The same day German troops put 36 holes in the plane of Captain L. A. Strange, of No. 6 Squadron, necessitating material repairs.

At the Dardanelles on April 27, Lieutenant Dunning, R. F. C., received so many hits on his plane that although he managed to land safely the plane had to be scrapped. This plane had been damaged to some extent by Turkish rifle fire on previous flights.

Later in the year in Mesopotamia, ground fire from troops accounted for four British planes. On November 19 Flight Sub-lieutenant G. F. Smylie was brought down by Arab rifle and machine-gun fire and forced to land in hostile territory. He landed safely and burned up his ship to prevent its capture. Two days later Flight Commander Major A. L. Reilly became a victim of Turkish machine-gun fire while observing at 3,000 feet altitude, and was "brought down and captured". The British lost another plane in the same manner later on the same day. Still another casualty on November 22 was the result of the accurate machine-gun fire of the 51st Turkish Division near Ctesiphon.

Airmen Hated Ground Fire

From the beginning the danger of ground fire was known and realized by the airmen. For every plane shot down there were many that escaped with holes that caused damage of varying extent. Henri Bordeaux, in *Guynemer, Knight of the Air*, says: "Guynemer amused himself by counting the holes in his wings" after a low altitude flight over the German lines. Major General Sir

Horace Smith-Dorrien in a dispatch covering operations on the Aisne in September, 1914, relates: "Nothing prevented them (British airmen) from obtaining the required information; and they frequently returned with rifle or shrapnel bullets through their aeroplanes or even through their clothing without considering such incidents worth mentioning . . . . I am not mentioning names, as to do so, where all are daily showing such heroic and efficient work, would be invidious." In *The History of 60 Squadron, R. A. F.*, Captain A. J. L. Scott says: ". . . low flying was never popular, the pilot not only being exposed to very severe fire from the ground, but also, being so low, was at a disadvantage when meeting enemy planes."

An official statement of the German opinion on this subject is that of Dyckhoff in *The German Air Forces in the Great War*. He says that in 1915 "the higher command became pressing and impatient in their demands (on the air force), for the situation involved a terrific strain on their nerves; the result was heavy casualties. If the enemy permitted our airmen to fly low, the machine was soon subjected to concentrated sniping and fire from the ground, particularly from machine guns, unfortunately only too often with disastrous results."

Losses In 1916

The incomplete records consulted list 12 planes shot down by the fire of troops in 1916. When six British bombers attacked Tel El Sheira in Mesopotamia on February 27, Arab rifle and machine gun fire accounted for two of them. In the same vicinity two more pilots made forced landings because of damaged engines in March; Lieutenant J. V. Tunbridge while on patrol on March 6, and Captain D. W. Rutherford on March 19. On the 5th an unnamed pilot was shot down near Es Sinn. Both pilot and observer were killed in the crash. Eleven Royal Flying Corps planes on June 19 attacked a Turkish airdrome at El Arish. Enemy rifle and machine-gun fire brought down three of these. A bullet from the rifle of a German railway guard struck the engine of Roland

Garros' plane over a small station on the Inglemynster-Kortrijk line. Garros was forced to land immediately.

One of the most exciting fights of the war occurred in July when a flotilla of coastal motor boats under Lieutenant Commander A. L. Coke, R. N., encountered eight German planes off the low sand dunes of Terschelling. The planes dived repeatedly at the small unarmored sea craft and badly defeated them. The victory, however, cost the German flyers one plane shot down by machine-gun fire from one of the boats. This encounter is described at length by Major Oliver Stewart in the *Journal Royal United Service Institution* for May, 1932.

Planes Now Fighting Each Other

By this time planes of all nations were equipped with machine guns and the spectacular combats of the air had begun. Flyers had also begun the sport of "ground-straffing" and ground troops were realizing that the airplane was even more of an enemy than had been apparent at first.

Seaplanes of the Royal Naval Air Service took part in the Konigsberg Campaign in the Rufiji Delta, German Southwest Africa, suffering two losses from ground fire. On April 25, Flight Commander Cull was spotting for the guns of the British ships when German and Askari rifle fire stopped his engine for a forced landing. This plane was rescued later in the day. Flight Lieutenant H. E. M. Watkins was not quite so lucky on May 15 when the combined ground fire of natives and Germans brought him down to crash on the water. Watkins was rescued by a British whaler. His plane was a total loss.

Still Greater Casualties in 1917

The snow and mud of the wintertime greatly reduced flying activities in the principal zones of the war. Not until April 8, 1917, is there another record of an airplane lost to the fire of troops. On that day German infantry shot down two DH-4's of No. 55 Squadron, R. F. C. near Mons when the squadron attempted to bomb Crown Prince Rupprecht's Headquarters. These were forced

landings in hostile territory. A third plane was shot down in the trenches as the squadron was returning from the bombing expedition. On the 10th of April, No. 60 Squadron lost three more near Arras. The *Official History* says that one plane was "shot down by bullets" and that "ground fire wounded the pilots" of the other two. All were wrecked on landing.

Von Richtofen's "flying circus" almost lost one of its prominent members on April 22 near Monchy. The German flyer came down to within 150 feet of troops of the 15th British Division. Machine-gun fire forced him to land in No Man's Land where he escaped to the German trenches. On May 7, No. 40 Squadron, R. F. C., lost to troop fire a plane engaged in observation duty.

Turning again to the Konigsberg Campaign in German Southwest Africa, we find that in July of this year, Flight Commander Cull was again forced down on the Rufiji Delta, this time from 2000 feet altitude with a badly damaged ship. Another British seaplane crashed in friendly territory after being exposed to German and Askari small arms fire for several hours.

Australians Find Troop Fire Hazardous

When the Australian Flying Corps took over a sector in Flanders in the fall of 1917 they, too, found danger in the fire of German ground troops. At Cambrai on November 20, No. 2 Squadron lost Lieutenant L. N. Ward who was forced down behind the German lines and captured. Lieutenant H. Taylor also crashed badly in hostile terrain but was unhurt and managed to escape. On this same day Lieutenant Holden, still more fortunate, returned safely from an observation flight with "every part of his plane shot full of holes." Two days later Lieutenant A. Griggs and his observer were both mortally wounded by troop fire and smashed up near Bourlon Woods. On the next day Lieutenant S. W. Ayres met the same fate.

By 1917 losses in aerial battles between planes had passed in numbers those inflicted by ground fire. Throughout the war, however, the rifleman and machine gunner

continued to take their toll. The last year of the war saw the greatest number of aircraft winged in flight that occurred in any year.

In *The Fifth Army In March, 1918*, by W. Shaw Sparrow, we find the war diaries of Brigadier Robert White, commanding the 61st Infantry (British), quoted as follows: "During the afternoon of March 22 the Germans had some 20 airplanes hovering over the village and diving with extraordinary daring almost into the streets. Of these, two were shot down by our men at very close range." On the next day at Epehy, Company C, of the 2nd Munsters, brought two other German aviators to earth, one by Lewis gun and the other by rifle fire. The pilot of one plane landed safely and was captured. The other, wounded by the troop fire, was killed in the crash.

French Also Lose Many Planes

The French as well as the British were now losing many planes by bullets from the ground. Colonel Guillemeny, editor of *L'Aeronautique*, the well known French aviation magazine, writes of these losses in a paper that he contributed to the *Revue d'Infanterie* of December, 1931. He says that 17 French planes out of 44 lost on the Arras-Amiens front during March, 1918, were brought down by ground machine-gun fire. At this time the French were using every means to stop the German drive. Low-flying attacks against German troops occurred almost daily.

On the German side the great Von Richtofen met his death on April 21st. Of his final defeat in the air the Australian official history says: "The honor of shooting down the redoubtable German was much disputed but the evidence of the time clearly indicated that it belonged to Australian Lewis gunners on the ground, although a British squadron of Camels never abandoned its claim to him." It is only fair to state that the matter is still unsettled. Apparently it could have been either enemy that caused him to fall.

On May 1, Captain D. W. Rutherford, A. F. C., was forced to land near Amman, Mesopotamia, by Turkish ma-

chine-gun fire. He destroyed his plane by burning to prevent its capture. Three days afterward Australian infantry had their revenge by shooting down two German planes at Shunet Nimrin.

In June, French infantry on the Marne shot down a low-flying German pursuit ship on the 16th, and on the 28th an infantry unit of the German 1st Army forced a hostile plane down and captured its pilot.

American Infantry Shoot Down Plane

The most detailed and exact account of an aerial casualty found in any reference was that of an American eyewitness, a member of the 119th Infantry, which was occupying a trench area at Voormezele in the Ypres sector toward the end of June. At four in the afternoon a hostile plane came in from the right flank flying low to the ground to attack the troops in the trenches. The infantry, many of whom were eating, grabbed their weapons and opened on him with rifles and with Lewis guns fired from the shoulder. The crews of several Vickers guns in emplacements also directed their fire at the unwelcome visitor, as he nosed down from an altitude of 300 feet to spray the area with tracers from his single gun, rocking his plane to widen the beaten zone. The heavy ground fire had effect within a few seconds, weakening the tail of the plane so that it began to flap. The German flyer turned to make an immediate forced landing in his own territory. One American infantryman was wounded.

On the 15th of July, German troops of the First Army brought down two Allied planes; and on the 18th, Major Mannock, R. F. C., was killed by German rifle fire while attacking a group of infantry.

The 8th of August, 1918, a decisive date in World War history, was also one of the worst days in the war for British aviation. Major General Sir Archibald Montgomery in *The Story of the Fourth Army in the Battle of the Hundred Days, August 8 to November 11, 1918,* says of the plans before the Battle of Amiens. "The eight scout squadrons of the 22nd Wing were to be em-

ployed exclusively in bombing and engaging with their machine guns suitable targets on the ground on the whole army front." Later, describing the first day of battle, he continues: "Apart from the usual artillery and contact patrol work two and sometimes three scout squadrons flew over each corps front, engaged solely in attacking the enemy's troops and transport from low altitudes. Flying very low, which even in trench warfare is extremely dangerous on account of the machine-gun fire from the ground, our aeroplanes completed the demoralization of the enemy by attacking his retiring troops and transport with bombs and machine guns."

Troops Fired At Planes In Spite Of Low Morale

By his next statement Sir Archibald shows that even demoralized troops will fire at attacking planes: "We lost on August 8, forty aeroplanes, *many of which were brought down by machine-gun fire from the ground.* The results obtained were well worth the losses incurred."

Not only did the demoralized Germans continue anti-aircraft firing, but also the Turks in Mesopotamia when they were in a state of even greater demoralization. The *Official History* tells us that, in this theatre of operation, where the Australian Flying Corps had spent most of its flying hours for several months harassing the retreating Turkish troops and trains, Lieutenant C. S. Paul attacked a Turkish cavalry camp on August 14, driving men and horses to the four winds. He returned to his airdrome, however, with 27 holes in his plane received on that one mission. A little over a month later on September 19 we find the still retreating and demoralized Turks still firing at the low-flying Australians. Between El Tire and Tul Keram on this day Lieutenant Dowling and his observer were both wounded and forced to land within the Turkish lines where they were captured. Later on the same day Lieutenant Tonkin, A. F. C., had his plane struck by "bullets from the ground" which forced him to earth. He was unhurt but was captured by the Turks with his plane.

In France, too, the beaten German continued to bring down Allied planes. On August 17, machine guns defend-

ing the German airdrome at Lomme brought Lieutenant E. P. E. McCleery crashing to the airdrome floor. On the 23rd Lieutenant F. M. Lock, another Australian pilot, was shot down near Vauvilliers but landed in friendly territory. On the last day of this month Lieutenant G. E. Kilburn, another Australian pilot, was the victim of German machine guns. Kilburn made a safe landing, however, within friendly territory.

Fire from German ground troops wounded Lieutenant Taplin, Australian Flying Corps, in the arm on September 5. A moment later another bullet stopped his engine and forced him down in the enemy lines where he was taken prisoner. Hostile machine-gun fire wounded Lieutenant T. L. Ballieu, A. F. C., and his observer on September 11 near Bouvincourt. They made a safe forced landing on their own side of No Man's Land.

Toward noon on the morning of October 4, according to the personal experience monograph of Captain Turner M. Chambliss, Infantry, U. S. Army, several groups of low-flying German planes machine-gunned the 30th U. S. Infantry, which was occupying a reserve position in the Bois de Beuge. The infantry had been ordered to keep out of sight as much as possible while the hostile ships were skimming the tree tops of the wood. But as Captain Chambliss relates "the temptation to fire on the low-flying planes was too great". The men opened fire on one of the groups and brought down three planes within the area held by the regiment. On the 7th of this month Lieutenant F. C. Howard, A. F. C., was forced to earth by enemy machine-gun fire, crashing unhurt in the British lines.

The last week of the war saw Lieutenant F. R. Smith, of No. 2 Squadron, A. F. C., shot down and made prisoner near Enghien on November 8. On the day before the Armistice a German rifle bullet stopped the engine of Captain Murray Jones, R. F. C., when he was flying 50 feet above the hostile lines. Captain Jones was made prisoner and released the next day.

Many Other Slighter Casualties

The numerous instances of planes forced down by troops do not comprise the whole story. There is in addition a long list of pilots and observers who were killed or wounded without loss of plane. There are also in the records many doubtful accounts in which it is not stated clearly whether the loss of plane was due to antiaircraft gun fire or troop fire. Further, for every plane forced down badly damaged or destroyed, there were a dozen or more that received smaller damage. Even holes in the wings require time for repairs and decrease the efficiency of an air unit.

Lest this article, recounting and emphasizing as it does only aerial losses from troop fire, give a false impression of the efficiency of such fire as it was used during the World War, it must be said that pilots of all armies often continued low flight missions successfully through every hazard. On any given day during the war, for each plane brought to earth by a machine gunner or a rifleman, there were scores that flew the gauntlet safely or with minor damages. Nevertheless, low flight in the presence of enemy troops—even demoralized and retreating troops —was always considered very dangerous. Few pilots kept up such flights with impunity.

History Since World War

The history of infantry antiaircraft fire since the World War continues the list of losses from ground fire. A *New York Times* report on September 27, 1925, says: "A careful study of the French aviation operations in Morocco reveals the fact that the percentage of casualties has been higher than that of the World War. This is due partly to the low-flying made necessary by the nature of the warfare and the excellent marksmanship of the Riffians and the difficulty met with in making forced landings on the irregular terrain." The French used their planes, not only to attack Riffian troops but also to drop supplies to their advanced outposts. Hence low-flying was the rule rather than the exception. A later Associated Press re-

port to the *Times* estimates the total losses to French and Spanish aviation from the ground fire of the Moroccan Riffs at 20 planes.

The use of planes against the Nicaraguan bandits in 1928 cost us one plane and its pilot and observer, and also another observer who died from loss of blood before the plane could return to its landing place. The newspapers have also recorded the loss of one British plane to natives in Afghanistan and the loss of one Chinese plane during the civil wars of 1927. And only recently in Manchuria, Chinese ground fire so damaged the bomb racks of a Japanese bomber that the bombs jammed and could not be released, resulting in the complete destruction of the large plane and its several occupants on landing.

The Shanghai Hostilities of February and March, 1932

Chinese troop fire also accounted for more than one Japanese plane, during the 1932 Shanghai war. Early in February a Japanese naval observation plane with its full crew of three fell a victim to Chinese fire from the ground. On February 22 when the Japanese bombed the Chinese airdromes at Hungjao and Soochow, a Japanese bomber was forced to land, probably by a bullet in the engine. The Japanese also lost a pursuit plane in March as a result of ground fire and also one seaplane. These facts are taken from a Japanese account, quoted in the German periodical "Luftschutznachrichtenblatt" for December, 1932.

Estimate of Total Losses

With incomplete data we cannot state accurately the total number of planes that have fallen before the bullets of riflemen and machine gunners. In the World War the French, German, American, and Italian air forces used their planes freely during 1917 and 1918 in the low-flying attack. In all probability their losses from ground troop fire were comparable to those of the British, which we have seen numbered at least several score.

Ground Fire Causes Reduction of Air Activity

The Marne Source Book of the Command and General Staff School, Fort Leavenworth (1923), gives this quotation from a field order of the 40th German Division, dated June 19, 1918: "The increasing difficulties experienced in replacing machines and in the supply of raw materials as well as in the recruiting of flying personnel compel us to employ our aircraft economically. In order to effect this, machines will only be sent up on tasks which are of vital importance to the battle." These were almost entirely tasks of artillery reconnaissance and even these were rigorously limited. Soon afterward similar measures limiting the employment of aircraft were put into effect in all the German units because they could no longer afford attacks against infantry by hundreds of planes such as they had launched earlier during the great Spring drive.

Our own Air Service also felt keenly the sting of troop fire. In the Final Report of the Chief of Air Service to the Commander in Chief, A. E. F., we find the statement that our planes (DH-4's) were found unsuitable for attack work. So many pilots and observers were shot down during the St. Mihiel operation that American planes were not employed in organized attack after that battle. In the Meuse-Argonne there were no American ships at all used for attack work except when occasional individual pilots did ground-straffing.

Considering all the evidence available, then, it is probable that several hundred planes have been shot out of the air by infantry and other ground troops' fire since the Italian pilot, Manzini, first suffered such a fate in 1911. As an airplane casualty factor rifle and machine-gun fire probably stood a good third to other causes during the World War. Planes wrecked accidentally and planes shot down by hostile planes doubtless formed the chief casualty classes except, of course, where the enemy had no planes as in the Riff war. Planes brought down by antiaircraft gun fire made a comparatively small fourth casualty group.

Little Or No Antiaircraft Training

The rifle and machine-gun fire directed against low-flying planes in the past has not to any degree been trained fire. In the World War, indeed, the only antiaircraft training that troops received was that experienced in battle itself. Where any firing rules existed at all they were of the simplest form. Moreover, there was very little special infantry antiaircraft equipment.

Since the World War infantry antiaircraft tests have conclusively shown that rifle fire against airplanes, shot for shot, is much more accurate than machine-gun fire. Each rifle shot at a plane is an aimed shot. The chief errors that cause such a shot to miss are those of incorrect lead and poor holding. In antiaircraft machine-gun firing these factors are also present. But the machine gun with its automatic fire is much harder to hold than the rifle with its single shots. In addition, there is a third and very large source of error present in antiaircraft machine-gun firing that is not present in antiaircraft rifle fire. The automatic weapon, fired while suspended at a single point as it must be in high angle fire, has a large dispersion due to the mechanical vibration and looseness of the gun. This is true of even the best antiaircraft adapters and mounts so far manufactured. Instead of having a dispersion cone from two to three mils high as it has in ground firing while tightly suspended at two points, the machine gun as fired by infantry at high angle targets has a dispersion diameter on the order of fifteen to twenty mils, even when fired by expert gunners.

These considerations plus the fact that no satisfactory antiaircraft machine gun mounts were available during the World War make it very probable that rifle fire brought down many more planes than machine gun fire. It is true that antiaircraft mounts for the Lewis gun were issued to British troops in the summer of 1917 but these mounts were poor ones at best.

On the whole it was seldom possible to determine accurately what weapon did the damage. The individual aimed shots of riflemen, particularly of men who had

hunted, and therefore knew something about leading a moving target, were very likely the shots that caused the greater part of aerial troop fire casualties. It is worthy of note that semi-civilized natives have been as successful in bringing down planes as have the members of well-trained armies. This again has for its probable explanation their experience and native ability in firing at moving game.

Had there been adequate lead data available to the ground troops of any army during the World War, the aviation of its enemies would have lost far more planes from ground fire than any air force did lose. Target size, target speed, and range in hunting as compared to these factors in infantry antiaircraft firing are far different. It is therefore probable that most machine-gun and rifle fire was aimed with much too small a lead except when the aerial targets came very close.

Passive Measures

More often than not passive measures were emphasized, rather than active ones. Troops were taught to take cover or remain motionless. As early as September 22, 1916, a memorandum issued by Advanced Headquarters, Royal Flying Corps, gives an interesting description of the effect of hostile planes on inexperienced ground troops and the passive measures employed: "The mere presence of a hostile machine inspires those on the ground with exaggerated foreboding with regard to what the airplane can do. At one time on one part of the front when a hostile machine appeared the leaders blew a whistle and the men hid in the trenches." This was done even when the plane was too high to observe men on the ground at all.

All ground troops seemed to learn eventually that offense was the best defense. Nevertheless, passive measures were taught and used until the end of the war.

An excellent example of the inefficacy of passive measures was shown by the Chinese army that occupied Chapei during its bombardment by the Japanese in the Shanghai hostilities of February and March, 1932. Chapei,

a thickly populated portion of the city of Shanghai was occupied during the bombardment by several thousand Chinese troops. In order not to give away their positions or their numbers, the Chinese did almost no infantry antiaircraft firing. Twice daily, six to ten Japanese bombers dropped their loads upon the city from altitudes of 600 or 700 yards or even less; but there were never more than two or three light machine guns directed at the aerial enemy by a total of several thousand troops during any attack. Frequently there was no antiaircraft firing at all. The bombing continued day after day with impunity; thousands of Chinese lives were lost and the property damage was estimated in the hundreds of millions. Had every Chinese infantryman rushed out to fire at the planes every time they came over, there is little question that they would have brought down a number of the bombers and forced the others to higher altitudes from which their bombing aim at important buildings and installations would have been far less accurate. Moreover, the moral effect of causing even a single Japanese bomber to crash to earth would have been tremendous upon the hard pressed troops of the 19th Route Army.

Offense Recommended Early

The desirability of counter fire at low flying aircraft was recognized by some leaders early in the World War. General Sixt von Arnim, commanding the German 4th Corps on the Somme in 1916 said in orders to his command: "A further lesson to be learned from this surprisingly bold procedure on the part of English airmen (low attack) is that the infantry make too little use of their rifles as a means of driving off aircraft." In the *History of the 9th (Scottish) Division,* Major John Ewing relates that hostile planes usually remained at a respectable height after it became a regular practice in the Division to fire at them from the ground. Captain A. J. L. Scott in his *History of 60 Squadron, R. A. F.,* relates that low flying became popular with the higher command in the Spring of 1917 "though not with the pilots", on

account of the "thousands of bullets fired at them from the ground".

Whatever measures were prescribed for ground troops attacked from the air it seems that inexperienced troops invariably scattered when first attacked and that there was little firing back at the flying enemy. But when repetition made these attacks seem a less fearsome thing more and more did men turn their rifles toward the diving attackers in sheer desperation and anger. The ground casualties in fact were seldom great. The British memorandum of September 22, 1916, quoted above also announced: "The moral effect produced by a hostile aeroplane is out of all proportion to the damage it can inflict."

Again, the hostile plane, diving in attack, could direct its fire at one small area only. Ground troops outside of this beaten zone were, for the moment at least, unmolested in turning their fire on the plane attacking other and neighboring units. Targets of this kind—non-overhead horizontal, or diving targets—were harder to hit than the direct diving target. Leads of sufficient length were seldom used by the ground troops. Nevertheless, enough men swung their aim far enough to the front of the moving target to swell the aerial casualty lists considerably.

Conclusion

In conclusion it can be said that the history of ground-air warfare forms a basis for the three premises stated at the beginning of this paper: ground troops will shoot at planes when they attack; low flying planes can be brought down by rifle and machine-gun fire; and the casualties inflicted by troop antiaircraft fire may be high enough to convince an enemy that attack aviation is too costly.

CHAPTER VIII

The Six-Hour Plan

A YARDSTICK FOR FIELD FORTIFICATION OF DEFENSIVE POSITIONS.

The first day of division maneuvers was over. Lieutenant Colonel "1st Battalion Blue 1st Infantry" was sitting in front of his tent, enjoying the evening and guessing about tomorrow's war with his staff and company commanders.

"I can tell you this," he said. "If we take up a defensive position tomorrow—and I can't see what else we're going to do, after a good look at the map—we're going to do some digging and put out some wire. I wonder if any of the bright young gentlemen on my staff have their slide rules along to figure man-hours with. When I took the Advance Course at Benning it took me four hours to figure trenches and wire for a battalion. And then I got a "U" on my problem. How about it, S-4? What do you remember about standing squad trenches and double apron fences?"

"I don't remember all that stuff, either, Colonel", replied S-4, "but I've got my bible along with me."

S-4 pulled a notebook out of his shirt pocket. "I've got some notes", he continued, "on the six-hour plan they taught us at Benning last year. The six-hour plan is a yardstick by which you can measure the job of preparing a defensive position for anything from a battalion on up to a corps or bigger. The big units are just a lot of battalions when it comes to digging trenches and putting out wire. So with this unit plan, you can figure the work for any size unit."

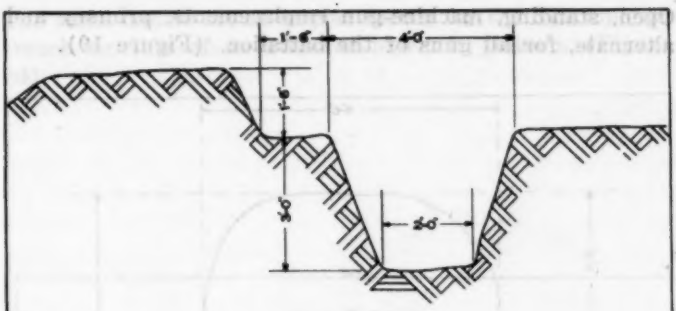
"All right, S-4", said the Colonel, "we'll have a brief review conducted by yourself. You gentlemen come inside where there's more light. Settle yourselves around and we'll hear about this six-hour plan. S-4 said it was a yardstick but if the Engineers got it up I'll bet it's a slipstick."

S-4 began his informal instruction: "Gentlemen, the six-hour plan is simply a statement of what a battalion can accomplish in six hours of daylight under normal conditions. More often than not a battalion won't be able to use the plan just as it stands. But given this plan and the actual conditions that may change it, you can adjust the six-hour plan to meet those conditions.

"Once the men are on the ground, with six daylight hours to work, and with the tools furnished by the Engineers to work with, a war strength battalion, digging in medium soil, with no enemy fire harassing them, can complete a satisfactory hasty defense position in six hours. That's where the plan gets its name.

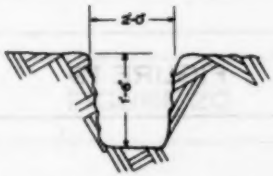
"The battalion is supposed to receive from the Divisional Engineer Regiment, at the request of the commanding officer of the infantry regiment, 26 axes, 125 pick mattocks, and 250 shovels. These tools are known as the Infantry Intrenching Equipment. The battalion also gets 3,000 feet of tracing tape and a lot of sand bags, nails and other supplies; also enough wire to construct about 1,800 yards of double apron fence and additional wire for the protection of forward combat groups, provided the engineers can get it up to them from the rear.

"With these tools and materials, then, the following fortifications are constructed: Simple standing squad trenches or an equivalent total length of shorter trenches of the same type, for the rifle companies. These are from 20 to 40 feet long and three feet deep. (Figure 17). Shallow, crawling, connecting trenches between the squads of the forward combat group, two feet wide and a foot and a half deep. (Figure 18).



Standard Profile, Simple Standing Trench

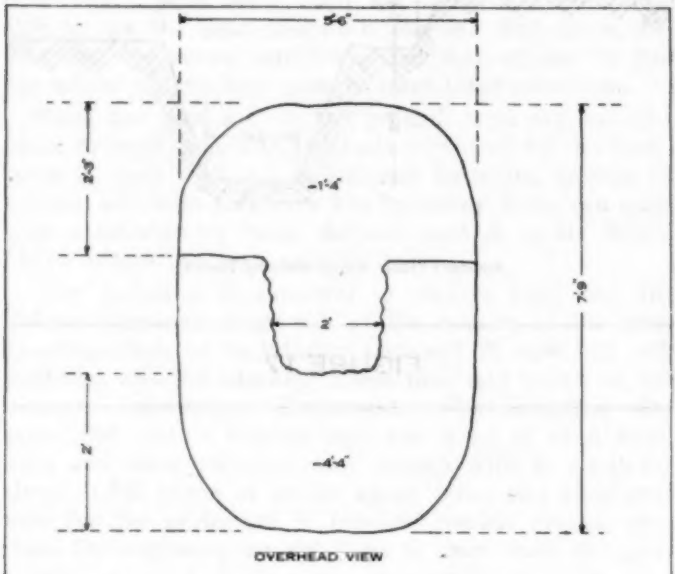
FIGURE 17



Profile of Shallow, Crawling, Connecting Trench

FIGURE 18

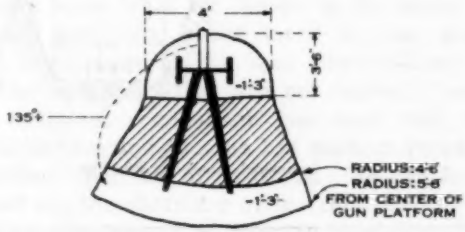
Open, standing, machine-gun emplacements, primary and alternate, for all guns of the battalion. (Figure 19).



Open, Standing, Machine Gun Emplacement

FIGURE 19

The same double set of emplacements for the 37's and the trench mortars of an attached howitzer platoon. (Figure 20).



The shaded portion is 1'-3" deep in the standing emplacement and 1'-1" deep in the shallow emplacement.

OVERHEAD VIEW

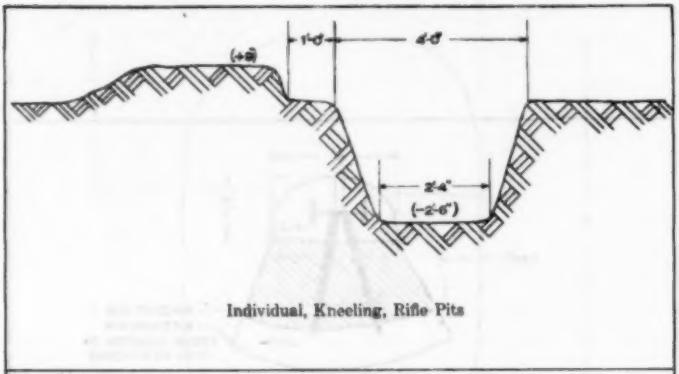
Open emplacement for 37-mm Gun

FIGURE 20

For the trench mortars a simple pit big enough to take the base plate will be needed.

"In addition to these there will have to be individual, kneeling, rifle pits for all men not protected by other

works. This means the higher numbers of the machine-gun squads and corresponding men of the howitzer squads. These pits are three or four feet long. They have the profile shown in Figure 21.



Individual, Kneeling, Rifle Pits

FIGURE 21

"There is no standard plan for the command posts, observation posts, and the aid station. The six-hour plan assumes that as far as possible in constructing these we will seek concealment by protection rather than by digging. Whenever we can do it, we should elaborate on natural shelter such as gullies, ditches, ravines, road fills or cuts, stream banks, gravel or sand pits, shell holes, cellars of buildings, and the like.

"It is also expected that we will put up about 1800 yards of double apron tactical wire. The purpose of this wire is to hold the approaching enemy under our fire. We place it across the whole front, from one side to the other without gaps, but not of course in a straight line. It must be within range of our own troops.

"The plan further calls for a hasty camouflage of all works, in which we use available materials such as grass, limbs, underbrush, etc.

"There are two other items in the plan: clearing the field of fire and erecting protective wire for forward combat groups. Protective wire, of course, prevents an enemy rush into our own positions. It should be placed from 30 to 100 yards from our trenches, close enough to be under continuous surveillance day and night, yet far enough from our positions to keep the enemy from throwing hand grenades into our trenches. The six-hour plan allows for a reasonable amount of time both for clearing and erecting protective wire.

"Now that we know what we can do in six hours with a war strength battalion, under more or less perfect conditions of work, here is the way the six-hour plan adjusts itself to conditions that are not normal. Let us suppose the battalion commander has been told what ground he will defend and that he has made a reconnaissance and decided upon his dispositions. He can look at the ground and see the character of the soil, hard or soft. He can estimate the amount of clearing needed and pick out the points where the enemy is likely to make his strongest attack.

"He should also get all the information possible as to the earliest moment when the enemy can launch its attack. He should estimate this himself and get the opinion of higher headquarters on it, too. This prophecy may turn out to be wrong but it's easier to change a plan that is in progress toward completion than to work without a plan of any kind at all.

"Now suppose the battalion commander finds out that the conditions under which he must erect his field fortifications are far from the perfect conditions that the six-hour plan assumes. He adjusts the plan to the actual conditions by using the following factors; by which the work possible in six hours or in fractions thereof is multiplied:

If the work must be done at night, multiply by 2/3.

If the men have to use their own intrenching tools instead of the larger engineer tools, multiply by 2/3.

For work under harassing enemy fire, multiply by 2/3.

For work in soft soil, multiply by 4/3.

For work in hard soil, multiply by 2/3.

"With these factors a battalion commander can find out how long it will take his unit to put the six-hour plan into effect. Here is a concrete example. The battalion commander knows that he can have his war strength battalion on the ground at 3:00 PM; that engineer tools will be available at 5:00 PM; that it will be dark at 6:00 PM, and that dawn comes at 4:30 AM. The soil is medium and the enemy can harass the working parties with intermittent fire.

"From 3:00 PM till 5:00 PM, instead of two hours' normal work, he will only accomplish 2 x 2/3 (the factor for small tools) x 2/3 (the factor for harassing fire). This is 2 x 4/9, or 8/9 equivalent hours.

"From 5:00 PM till 6:00 PM the battalion will have large, engineer tools and in this hour will do 1 x 2/3 (the factor for harassing fire), which is equivalent to 2/3 of an hour.

"Supper will take a half hour. Work will begin again at 6:30 PM. From 6:30 PM to 4:30 AM is 10 hours of darkness, during which the work must be done under enemy fire. These ten hours are equivalent to 10 x 2/3 (the factor for night work) x 2/3 (the factor for harassing fire). This is 10 x 2/3 x 2/3, or 40/9 hours.

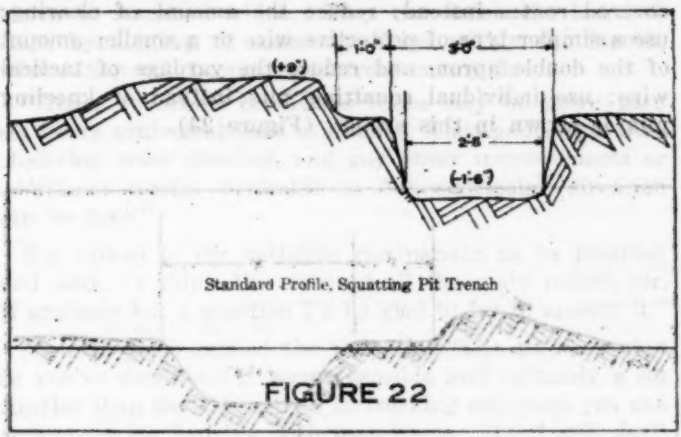
"Then, before dawn the next day, the battalion can accomplish:

From 3:00 PM to 5:00 PM - - - 8/9 hours
From 5:00 PM to 6:00 PM - - - 6/9 hours
From 6:30 PM to 4:30 AM - - - 40/9 hours

or a total of 54/9, or 6 equivalent hours of work. The battalion commander knows, therefore, that he can finish the six-hour plan by daybreak, making due allowance for all factors that will slow up the work.

"Now, if the equivalent time should prove to be less than six hours, there are many ways in which the work can be reduced. In this event part or all of the works must be simplified, for example:
Instead of the simple, standing, profile trench, use the

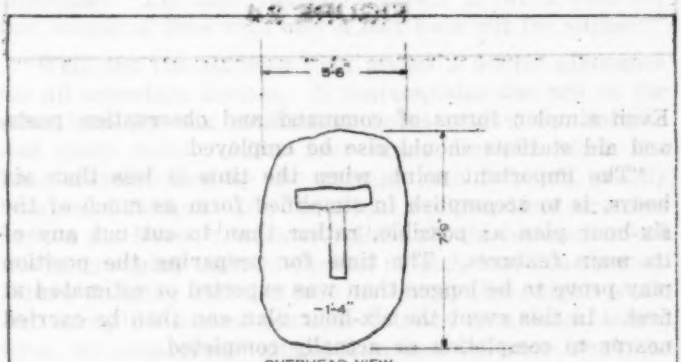
squatting pit profile. (Figure 22).



Standard Profile, Squatting Pit Trench

FIGURE 22

Instead of open, standing, machine-gun, 37-mm, and mortar emplacements use open shallow emplacements as shown below. (Figure 23).

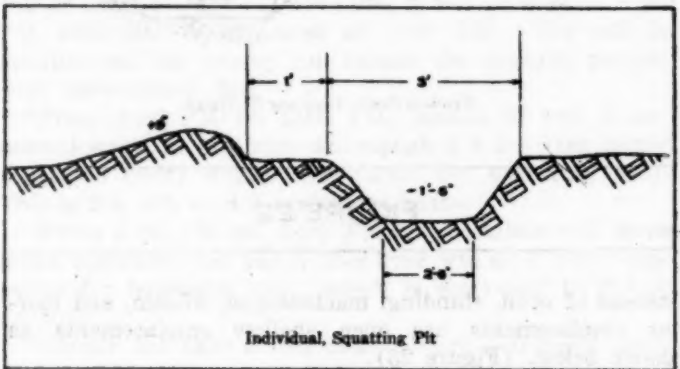


OVERHEAD VIEW

Open, Shallow, Machine Gun Emplacement

FIGURE 23

Eliminate part of the connecting trenches, using natural covered routes instead; reduce the amount of clearing; use a simpler type of protective wire or a smaller amount of the double apron, and reduce the yardage of tactical wire; use individual squatting pits instead of kneeling pits as shown in this sketch. (Figure 24).



Individual, Squatting Pit

FIGURE 24

Even simpler forms of command and observation posts, and aid stations should also be employed.

"The important point, when the time is less than six hours, is to accomplish in simplified form as much of the six-hour plan as possible, rather than to cut out any of its main features. The time for preparing the position may prove to be longer than was expected or estimated at first. In this event the six-hour plan can then be carried nearer to completion or actually completed.

"When the time is less than six hours, the troops should dig the trenches narrow, say two feet wide, and deep enough to give them cover, say two feet. They should then widen the trench at the top and slope the sides before making it deeper. This will protect them from cave-ins caused by artillery fire. This accomplished, they

should deepen the trench to standard depth and then widen to standard width. They can finish the last two steps by digging, if necessary, from within the trench, where they will be protected from enemy fire.

"Under favorable conditions there may be more than six hours equivalent time available. Then additional wire obstacles, more clearing, and any other improvements or additional works, desirable in the particular situation can be done."

S-4 turned to the battalion commander as he finished, and said: "I think I've covered all the main points, sir. If anybody has a question I'll be glad to try to answer it."

"I have one", replied the Colonel. "The six-hour plan as you've described it seems sensible and certainly a lot simpler than the old method of working out what you can accomplish by figuring with man-hours. But I still don't see how you can use the plan without taking into consideration reliefs for the working parties. The equivalent hours that you used in the example you gave us stretched from 3:00 PM to 4:30 AM, thirteen and a half hours altogether. I'm sure you don't expect to work men for that length of time with only a half hour out for supper?"

"Well, sir, the six-hour plan makes a liberal allowance for all uncertain factors. It contemplates the use of the same men for six continuous hours and a ten minute rest every hour. After four hours straight work the labor accomplished by the average man falls off greatly because of fatigue. If your actual working time stretches beyond six hours, four-hour reliefs should be used on all works, changing tasks at the end of each four-hour period. Where delaying factors, such as enemy fire, night work, etc., stretch a normal six-hour job out to a much longer time, an emergency situation arises. There won't be enough men available to work four hours on and four hours off. In such circumstances, however, the rate of work is slowed up by the delaying factors and the men don't get exhausted as soon as they would working at maximum efficiency. Moreover, the six-hour plan is based on very conservative work capacity data, which allows

such emergency situations to be met by using additional rest periods for the work parties.

"There are so many variable factors in the six-hour plan that it is impossible, of course, to say dogmatically that a given number of men will accomplish under a certain set of condition any exact amount of work. As a matter of fact, highly trained troops, working like clockwork, under excellent conditions, might easily complete the six-hour plan in four hours or even less. The plan as constituted is flexible but gives us as accurate a basis for estimating the work as we can expect in view of the numerous variables it must embrace."

Captain "Company A" then asked a question: "How about the assignment of tasks? Each unit does its own work, doesn't it?"

"Yes, sir", replied S-4, "with some exceptions. The machine-gun company usually puts up the tactical wire, which holds the attacking enemy under our fire. The tactical wire has to be closely coordinated with the fire of the automatic weapons, particularly the machine guns. Consequently, the machine gunners get the job of erecting it. They are helped out, if necessary, by a detail from the reserve rifle company."

"Isn't it better", asked another company commander, "to do all the work you can at night?"

"Yes, sir from a tactical viewpoint, when you are in the presence of the enemy. You have a better chance to do it unobserved. But it is slower, as I said before, and therefore not so efficient. When the work has to continue after dawn the tasks should be carried out in such a way that the work left over for the daylight hours can be finished under cover.

"Another thing, unless the work is done under cover such as dense woods, camouflage should proceed consistently with construction. Excavated soil is the most important thing to hide. You can spread it on existing roads or hide it under trees and bushes. You have to take what you can find—brush, weeds, branches, etc.—to do the camouflaging. This stuff has to be replaced whenever it wilts or dries out".

"How do you divide up the tools?" someone else asked.

"The two front line companies each get a third of them; the reserve company gets one-sixth; the machine-gun company, one twelfth; and miscellaneous units, one-twelfth. This last fraction should include a small reserve of all types of tools. Special conditions, of course, may alter this tool assignment and when the amount of clearing has been estimated before hand, the axes and saws should be apportioned accordingly. As the work progresses the tool assignment should be changed whenever necessary. Continuous inspection and adjustment has to be carried on from the time the work begins until it's finished. The execution is decentralized but subject to inspection. Company and platoon commanders lay out the work and supervise it. This inspection is more for coordination than for checking the widths of trenches and the like. Those are only approximate, anyway."

"I have a question", said company commander "Company B". "What do you do in the exceptional case? When I was in the Philippines, on one of our maneuvers up in Pampangas province, we had to defend 12,000 yards of front with a single, peace-strength battalion plus two machine-gun companies."

"I should say", the battalion commander broke in, smiling, "that you'd have to do the best you could. What do you think, S-4"?

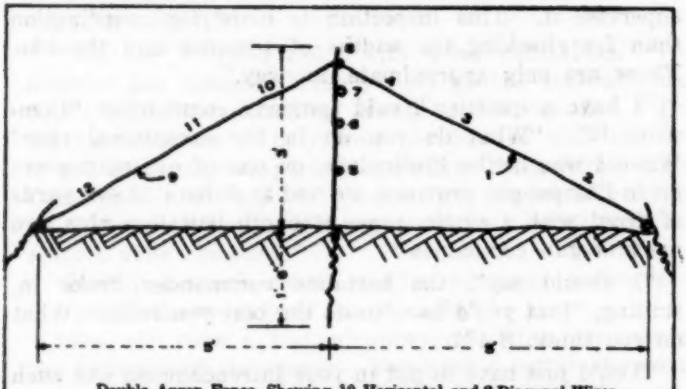
"You'd just have to put in your intrenchments and such wire as you could. If you had a great deal of time, I think you'd put in a good many alternate intrenched positions, too. The six-hour plan should be put in effect as far as possible when the circumstances are exceptional and then the necessary additional works should be tackled. I have here in my notebook a table of excavation hours that would be valuable in such a case. This table assumes the same conditions that the six-hour plan does: medium soil, engineer tools, daylight, and no enemy fire.

Number of cubic feet excavated per man in							
1 hr.	2 hrs.	3 hrs.	4 hrs.	5 hrs.	6 hrs.	7 hrs.	8 hrs.
23	37	49	60	71	81	91	100

"These figures should be multiplied by the same fractions that you use in the six-hour plan, for night work, small tools, hard or soft soil, and harassing fire. When the ground is hard two picks work with one shovel; when it's medium soft, two shovels go with one pick.

"I also have a sketch here showing the double apron fence. It's just a four-strand vertical fence with a sloping apron, front and rear, which has three horizontal wires and a diagonal. You can build the upright fence first and add one or two aprons later, if you haven't time to do the whole thing at once. (See Figure 25.)

"Fifty yards of double apron fence can be put up in 30 minutes by a ten-man erecting party and a 16-man



Double Apron Fence, Showing 10 Horizontal and 2 Diagonal Wires

FIGURE 25

carrying party, where the carry is not more than 800 yards. This fence weighs ten pounds per running yard of obstacle. Fifty yards of four-strand vertical fence can be erected by an eight-man erecting and an eight-man carrying party in 15 minutes for a carry of not more than 400 yards. It weighs four pounds per running yard."

"One other thing. Light brush can be cleared at the rate of 100 square yards per man per hour."

"Well, gentlemen", said the battalion commander, "if there aren't any more questions, I think we can close the meeting. I didn't realize I had quite such an engineer as S-4 on my staff. Let's go to bed; and tomorrow, if we have to dig in we'll let S-4 apply the six-hour plan for us."

On the next day, the 1st Battalion Blue 1st Infantry found itself assigned to brigade reserve in the woods west of RJ 705-A (363.2-733.2). (See Special Map No 1 at back cover of book). Almost all morning a heavy rain fell. Just before noon the division occupied a defensive position facing generally south on the high ground north of Big Pipe Creek. The right of the division was near Hill 586 (361.65-731.00) and the regimental reserve line followed the ridge about 1600 yards north of the creek. The only sign of enemy activity was a light attack from Markers Mill eastward.

In the early afternoon Lieutenant Colonel "1st Battalion Blue 1st Infantry" received an order to report to the brigade command post at RJ 705-A immediately. Taking S-3 and S-4 with him he arrived there at 3:00 PM.

"Have you reconnoitered to the west?" asked the brigade commander.

"Yes, sir. As far as RJ 532-B, RJ 607-B, and RJ 570-J."

"Are you ready to move?"

"Yes, sir. Extra ammunition has been issued and we're ready."

"Very well, colonel, I'm going to put you to work. Your battalion and attached howitzer platoon will extend our right. Your main line of resistance will be: left limiting point RJ 570-J (361.4-731.3) to 2d Battalion 1st Infantry — RJ 536-H (360.7-732.9). The 2d Battalion 2d Field Artillery will support your defense. Put your command post at RJ 680-E (See Special Map No 1). Have your S-4 get his information about fortifications materials from Lieutenant "Staff, 1st Battalion 1st Engineers". We don't expect an attack in force until dawn tomorrow. However, all fortifications work will cease at

4:00 AM. The enemy has no aviation and we have none. That is all."

S-3 found out that an engineer dump was in the woods just north of hill 706, ready to issue barbed wire, pickets and 2,000 yards of concertina entanglements, already made up in 20-foot sections. S-3 asked for tools also, and found that a full set of infantry intrenching equipment was ready on a wagon at the engineer dump.

"You can use the wagon until daylight tomorrow", said the engineer officer. "Be sure to get it back to us then for we'll need it."

S-3 then joined the battalion commander who was studying his map just outside the command post. Captain "Brigade S-4" walked over just then and said: "Colonel, you can get your ammunition from the brigade distributing point any time after 10:30 tonight."

"Thanks, Captain". The Colonel turned to his own staff members. "I've decided to occupy this ground here. (See positions of combat groups indicated on Special Map No 1.) Do you gentlemen have any suggestions?"

As the battalion commander drew the positions in with his pencil, S-3 and S-4 watched him. Neither suggested any change.

"How long before we can start digging, S-4?" asked the Colonel.

S-4 studied the map a little longer, "We should be able to get going by 4:45, sir. Dawn comes at 5:30 AM and we can not count on any work after 4:00 AM. That gives us 11¼ actual hours to work in."

As they rode back to the battalion reserve position the Colonel thought over his order and issued it as soon as he could get his company commanders together at 3:35. He gave them all the information he had received from brigade. He directed them to organize the positions as already indicated on Map No 1. He ordered a maximum use of field fortifications to strengthen the new positions.

His order given, the Colonel and his staff got in the car and slipped and slid over the muddy road to the new command post at RJ 680-E.

When they arrived and dismounted the battalion commander said to S-4, "I guess you'll have to play part of your six-hour plan on a concertina. That will save some time, won't it, having the wire already made up in sections?"

"Yes, sir, it will. I'll figure out the whole plan now as fast as I can."

Knowing that infantry intrenching tools were ready for issue S-4 then sent word to Battalion Headquarters Company to pick up the tool wagon at the engineer dump; establish a tool dump at RJ 646; and issue tools to the battalion as it moved up to the position.

He then got in touch with Captain "Company D" and the two decided on tactical obstacle material dumps east of the RJ 536-H—RJ 607-B—RJ 615-B—RJ 621-C—RJ 570-J road. The machine-gun company commander had not had time to make a detailed reconnaissance to locate these dumps so they picked them from the map and decided to place materials as follows:

Material dumps for double apron fence materials (for Company D), dumps to be opened by 4:30 PM:

At road bend 250 yards southwest of RJ 636-A;

At RJ 621-C.

S-4 then sent word to Battalion Headquarters Company that the battalion wagons, which had been emptied of their load of extra ammunition in the morning, would begin hauling these materials at once to the two dumps and directed that the dumps be established. Other wagons of the battalion were to be used as soon as available. He further directed the wagons to stay on the roads because of the wet condition of the ground.

He estimated that this job should be finished by 6:00 PM and decided to begin hauling protective obstacle materials at that hour and open the dumps by 8:00 PM. The job should be done by 10:30 PM when the wagons would be needed for ammunition. He selected locations for dumps as follows:

Road bend 250 yards southwest of RJ 636-A (for combat groups 1 and 2):

Double apron fence material, 3,000 lbs;
1,000 yards concertina;
4-strand fence material, 2,500 lbs;

Road bend 250 yards southeast of RJ 536-H (for combat group 3):

4-strand fence material, 2,000 lbs;
1,000 yards concertina.

Unimproved road end 250 yards northwest of hill 661 (for combat group 4):

4-strand fence material, 2,400 lbs;
Double apron fence material, 2,000 lbs.

RJ 621-C (for combat group 6):

4-strand fence material, 2,400 lbs;
Double apron fence material, 2,000 lbs.

RJ 609-K (for combat group 7):

4-strand fence material, 1,800 lbs;
Double apron fence material, 3,500 lbs.

Just then the battalion commander returned from a brief reconnaissance of the area. The Colonel grinned, looking at his mud-covered boots and clothing. "There's no doubt about it. The ground is soft enough on top. But once the troops get digging they'll find it medium under the surface, I should say.

"Those forward companies have quite a bit of clearing to do," he continued. "I estimated 24,000 square yards for A Company and about 20,000 for B. The machine gunners will have to clear some for their fire lanes, too. You'd better give them a detail from C Company. I didn't see any sign of the enemy. In fact I couldn't hear any firing at all, anywhere."

"Yes, sir," said S-3. "I'll figure out the six-hour plan now. I think I have all the information I need, sir."

"We'll have to reapportion the tools later, sir," said S-4. "Probably C Company can finish part of its own work and then send a detail with the reserve tools to help out D Company. A Company will need some of B's saws and axes, too. It has a larger amount of clearing."

S-4 then ordered Battalion Headquarters Company to establish the dump for protective materials and to begin hauling as soon as all tactical materials had been hauled.

He also notified all units where these dumps were and when they would be opened.

Then he said to the battalion commander: "Now, with regard to the six-hour plan, sir. It will be dark at 6:15. Subtracting 1½ plus ½, or 2 hours, from 11¼, the total actual time available from 4:45 PM to 4:00 AM, leaves 9¾ hours. Multiply that by 2/3 (the factor for darkness) and we get 6¼ equivalent hours. Thus we have 6¼ plus 1½, or 7¾ daylight hours and hours equivalent to daylight to finish the six-hour plan. We'll have 1¾ hours more than we need. We should finish the six-hour plan a little after 1:00 AM unless the enemy starts harassing us or the ground proves harder than it looks. What do you want the troops to do, sir, during the extra time available?"

The battalion commander and his staff then conferred on the most desirable works to be accomplished over and above the six-hour plan. They decided on the following:

For Combat Group No 1, 350 yards of double apron protective wire;

For Combat Group No 2, 300 yards of 4-strand fence and 850 yards of single cylinder concertina, partly picketed and stapled—all of this to be protective wire.

For Combat Group No 3, same as for No 2.

For Combat Group No 4, 200 yards of double apron protective wire, and 68 man-hours of clearing.

It was also decided to dig a shallow communication trench to connect combat group No 6 with the woods to the east, because this group was on an exposed forward slope.

In most of the battalion area the work began by 4:30 PM. The whole battalion was busy by 4:45 and by supper time it had accomplished a considerable amount of digging and wire laying. Supper over, the work began again. About ten o'clock a bright half-moon came up to make the visibility better and the work easier. By 11:00 PM it was apparent to the battalion commander that the six-hour plan would be completed ahead of schedule. He therefore decided to lengthen out the rest periods

and when the kitchens sent up hot coffee he declared an extra rest of fifteen minutes.

By 1:00 AM the six-hour plan was complete as shown cn Special Map No 2. And at 4:00 the extra work was finished, too, and every soldier was sleeping so soundly, wrapped up in his raincoat and shelter half, that the dampness of the ground was no hindrance at all.

At dawn the regimental and brigade commanders came around for a look. They expressed themselves as satisfied except for one or two minor differences of opinion as to the position of the tactical wire. After the inspection the general announced to the battalion commander: "There will be an armistice until 10:00 AM. The troops have worked all night with little rest and it has been decided to call everything off until ten. In war, of course, it might well be necessary to begin the day fighting with tired out troops. Field fortifications can never be too good. You have done a good job, Colonel. You ought to be able to hold out here for a long time against heavy odds."

As the inspecting party rode off in its car, the battalion commander turned to his staff, smiling, and said: "Well, gentlemen, I guess we can use some sleep at that."

CHAPTER IX

Operations of Company D 8th Machine-Gun Battalion in the Champagne Marne Defensive

A BAPTISM OF FIRE

PERSONAL EXPERIENCE MONOGRAPH OF
MAJOR JOHN S. SWITZER, INFANTRY

The 20th of April 1918 found Company D 8th Machine-Gun Battalion in France eager to do battle. But we had no machine guns, no pistols, no carts, no animals. Moreover, our training in the good old U.S.A. had not only been too brief, but so hurried that it had resulted in a sort of mental indigestion.

Then came the 30th of May 1918, when the hand of Fate grabbed our eager little outfit by the seat of its pants and slapped it down, commanded by a Marine Corps major, on the banks of the Marne River in the very forefront of battle and in the midst of a French infantry regiment. And nobody spoke French! True, we now had machine guns, and some pistols, but we were scarcely on speaking terms with them. We hardly knew where we were, or how we got there.

Let's go back a bit and find out why we were there, what was happening and what was expected to happen.

At the beginning of 1918 the German High Command was convinced that a decision must be reached with all possible speed. Time was becoming increasingly a matter of vital importance.

Accordingly, three Grand Offensives were planned for the year. The combined results of the three were definitely counted upon to end the war, for the mission of each offensive in itself was comprehensive enough to bring about a victorious decision.

The first Grand Offensive toward Amiens gained significant success. National jealousy among the Allies disappeared in the face of threatened disaster. Foch became Commander-in-Chief.

The second Grand Offensive resulted in an advance of more than fifty kilometers and in the formation of the famous Marne Salient. Untrained and partly-trained American troops were hurled into action. Again the Kaiser was banging with mailed fist on the doors of Paris.

It was to assist in holding back this second blow that my company was abruptly yanked out of the quiet green hills of Orges, near Chaumont. We were busy learning how the Hotchkiss machine gun worked and how to reason with our mules; the next day we were actually to fire our automatic pistols. Then came an order to stand by—to get ready to move. No more information—just that. We had heard that alarming things were happening at the front; consequently there was excitement, expectancy and some confusion. Our Marine Corps major remained calm and cool—a lucky thing for us all.

At Bricon, we entrained—after a long, long delay. It took two days to get us under way. The railways were congested; but we had no idea how greatly. It was a restless, impatient body of men and officers who grumblingly bivouacked in a field near the station.

I looked at these men of mine who, four or five months ago, knew nothing of war or of soldering; men who were poorly trained because we had lacked officers and equipment; men of mixed races, different religions and occupations. These were the men I was to lead into battle.

The first troop train of the 3d Division pulled out with us and many a similar company on board. We clattered along in good spirits, nevertheless. We weren't close enough yet to feel or show fear, though what one felt like inside was something else, perhaps. It was exciting to see other troop trains, to yell at them, to have flat car after flat car of 75's go swiftly, grimly by. It was adventure and reality at last.

We rode for about one day and then detrained, left our carts and animals, and got into camions driven by Chinaman, supervised by Frenchmen. Still we didn't know where we were going. It was a military secret. When night fell our wondering became tinged with some concern—ambulances began to go past—and we could hear

guns. Soon we could see the flashes in the distance. Stragglers began to plod by. It seemed as if every one was going home but us. But that wasn't funny for long. Uncertainty of destination and purpose was beginning to make our nerves thoroughly jumpy. The cries of the wounded in the ambulances were hardly calming. The firing became louder and louder.

Some time or other we reached a small town called Monthurel. (See General Map opposite page 139). The road was jammed, so we sat by the side of it. An occasional doughboy came by and we began a long, long series of "What outfit buddy?" And then we heard wild tales—and believed most of them!—how the 7th Machine-Gun Battalion had rushed to the bridge at Chateau Thierry—how it had turned back the whole German army—a few had been killed—scores had been killed—the entire battalion had been wiped out—the war was over. Actually, however, the fight seemed to have stopped for a while.

Here at Monthurel our battalion was split up and the individual companies sent off to positions with French units. Company A went to Courthiezy, Company B hiked off to St. Eugene, but my company was snubbed and left to shift for itself in an orchard. Some 155's and 75's were already there, and kept spitting and roaring away, jarring our very teeth and making our mules wish they were back in Spain.

A day passed, maybe two, and then a French messenger caught me and gave me my first actual order in war. It was an order written in French and signed by a Colonel Mouloise.

I tried hard to look as if I knew what it was all about, said, "Bone" to the soldier, and guessed I'd better find this Colonel Mouloise. It seemed the logical thing to do—and maybe he spoke English—but before I was well on my way, a second messenger handed me a second puzzle, another French order signed by the same officer, apparently modifying the first one.

Things were going pretty fast, I thought. Everybody else had gone off somewhere; there was no one of whom

I could ask foolish questions. I was on my own—under French command. No one had said so, but there I was anyway. Apparently we were to report to another Colonel —a Colonel Buhler—I started off again.

After a three or four mile hike, we climbed a big, tree-covered hill, and in a farm house on its top I found the Colonel—a fatherly soul, in command of the 47th Colonial Regiment of Infantry. I spoke no French, he spoke no English—so that was that.

Somehow I got into the hands of a very stout and moustached French captain. Evidently he was their machine-gun expert because he pantomimed that I was to follow him and learn where to put my guns. My officers and I went with him, leaving the company in the woods near the farm house. All of us were still wondering what it was all about.

This Captain Michel may have been fat but he could surely scamper through bushes and up and down hills. We inspected our own hill from the river to its top and back again several times. Now and then he would stop and indicate a spot for a gun, or maybe two guns. Some of these places looked all right to me and some didn't—but my opinion wasn't asked.

And so Company D came to rest on a hill above the Marne near Dormans, with some guns down by the river itself. My guns had been put in, my trains located, my command post designated (with the regimental command post), and my fields of fire prescribed for me. I just did what I was told, and was glad to do it, because these were French veterans.

We were duly impressed and fully expected an attack at any moment—an attack that didn't come. Slowly everything, including our nerves, reverted to normal. We began to get the hang of routine in a quiet sector. The French seemed to think conditions had calmed down for a while. They didn't behave excidedly—and so we imitated them.

My men were scattered all over 2000 yards of frontage. It took two or three hours to inspect all of the guns. The men slept in little trenches near their guns; one man

from each squad was always on the alert. All contact was by runner.

In a way we began to enjoy life. The weather was magnificent, and except for the scheduled 8-12-4 o'clock (AM and PM) straffing on selected areas, nothing happened.

I made regular inspections, held some school on barrage fire, and reconnoitered the nearby positions. Each gun had its fire table, final protective lines, and range chart. Most of the guns were located to fire along paths through the woods. A few were placed to fire on certain spots along the river bank (somewhat plunging fire) and to cover a road leading up the hill from the river. In the event of attack we had rocket signals to use. We were to watch for them, too. But, in general, we were to wait for the enemy to gain the wooded hilltop before we saw action, and even then it was to be a gun by gun affair. Our only specific instructions were:

(1) Fire when we saw Germans

(2) Hold to the end, at all costs.

Our stay with the French was really a valuable experience. We saw, or rather heard, a few German patrols on the river. Lt. Flannery of the 7th Infantry, which was in the same general sector, swam over one night and brought back a wounded Frenchman. While this was a brave thing in itself, the French were more impressed with the fact that we didn't hand the Marne much as a river—to swim it meant just about a good big dive. Apparently French soldiers aren't trained to swim and wondered why we didn't have water wings. Now and then we'd get caught off base when the routine straffing began, and one night a party of us on reconnaissance had a whiz bang hit so close we all dove for the nearest hole—one officer landed in an old straddle trench. Not so good, but it was cover! And we learned about cover from that!

It was a nonchalant existence—the Germans reminded us of their presence at 8-12-4, the French promptly sent back an acknowledgement and the day was done.

I tell all this because it shows our introduction—our

preparation for what was to follow. It was Act One of the Marne Drama. Here with the French, we learned some of the business of war—to keep a bit calm—not to begin an offensive because a shell came over, or because we saw a working party, or heard a patrol on the river bank. A sudden, unexpected shot taught us the danger of careless exposure. We learned how to improvise, to camouflage, to dig a dugout. We learned the tricks in selecting and emplacing a machine gun, in wiring it in, in building a field of fire by wire and axe, in getting as comfortable as possible, in feeding our men; our newness wore off a bit. These French put a machine gun in position by personal reconnaissance with little regard for a map. *Afterward* they located the gun on the map. This was important.

On the Fourth of July orders were received to report to the 3d Division sector—our *own* sector. This was welcome news indeed.

The 3d Division sector was just west of the French division to which we were attached. On the next day Company D marched across the boundary to Bochage Farm and reported to its brigade. A little vagueness had to be cleared up as to where we came from and where we were to go. Then we went in behind the 7th Infantry, opposite Gland. (See map.) The Marine Corps major left and we acquired one of our own.

In general, we were to defend the area between the Aqueduct Line and the Woods Line: that is, our mission was more or less to furnish breakthrough guns between the main line of resistance and the forward areas. A personal reconnaissance (after the fashion of our French captain) established the guns. They were placed to give flanking fire upon all clear spaces and ravines between the front and support lines. In case of attack the positions were to be held to the end. Except for special barrage missions, the guns were to fire only in case the Germans broke through the front lines. Each gun had a distinct mission and a final protective line. Four guns from Company C were attached to the company to be used on special missions when needed—a mobile battery so to

speak. (See special map opposite page 139) One special mission was assigned—the firing of a barrage on the north bank of the Marne River beyond Gland. Upon completion of this barrage the guns were to return to their battle positions.

In carrying out instructions for the emplacement of guns we received little cooperation from the infantry. They were there first, and their attitude was: "We don't want you around here drawing fire on us; you can go hunt a place for yourself." They did want to plot us on their maps, however. To get infantry protection for isolated guns was almost impossible. Certainly machine guns, then, were not the skeleton upon which the defense was built up; nevertheless, they were to prove themselves part of its backbone—particularly those in the forward zone.

It was hot, clear weather. The country was beautiful and gave a deep impression of peace. Each day witnessed improvements in gun emplacements and dugouts—Lord knows there was room for it! What innocence!

In a short time life became a bit monotonous. There was the usual straffing at 8-12-4. Occasionally we saw very high bursts of shrapnel, and guessed that the German ammunition was getting rather bad. (How dumb we were! It was high angle registration on our command posts, gun positions, etc!) There were the usual inspections; the daily report: "No activity of note". We worked on alternate emplacements for each gun and perfected battle positions which were to be used only in case of attack.

Then came rumors of a big German attack that would jump off some time soon, perhaps on Bastile Day. The rumors became more persistent. They took definite shape.

So came July 1918. Again the military situation of the Allies was desperate. Some frankly predicted defeat. Russia had collapsed. Italy had met with disaster. Man power was dwindling. Endurance was breaking.

Clemenceau sized it all up when he said, "I fight *before* Paris, I shall fight *in* Paris, I shall fight *behind* Paris!"

To the Germans it looked like victory at last; confidence

had returned. However, time was pressing. The great effort must be made soon. The Americans were coming; the people at home were restless. The third Grand Offensive—the "Battle for Peace"—the "Kaiser's Battle"—must be launched during July.

Between Chateau Thierry and Jaulgone the Germans massed three selected divisions—at least seven regiments and 900 guns—whose main effort was to be directed through the natural gateway of the Surmelin Valley with the ultimate object of piercing the allied line between Chateau Thierry and Rheims. But in the way lay the 3d U. S. Division.

Although the German concentration had become known, the day of the attack remained problematical. We learned of all this and were told to expect heavy raids as the enemy attempted to get information.

We grew expectant, curious, a bit jumpy, a bit nervous, —a bit eager. We weren't veterans yet. We went over our plans and defenses. We were "alerted". We tried to anticipate where a raid, or a general attack might be launched. We figured our barrage data once more, and went over our special missions. We were exceedingly careful about concealment; we did everything but walk about holding a branch over our heads. Regarding adequate cover, however, we were to learn much. Watchful waiting had arrived.

The dawn of July 14 came peacefully. A glorious day. Nothing happened—the sector was as quiet as usual. We went about our usual duties. We were getting a bit fed up on these alerts. In the evening I set out on my usual round of inspection. Dark didn't set in until about 9:30 o'clock, so it was 11:00 or 11:30 before I got back to my command post. Just what I did the next half hour I don't recall. I probably sat around and talked. I do recall that our artillery seemed a little more active, and that some one said we were sending over a generous sample of a new gas in addition to the regular strafe.

At last I went to my dugout to go to bed. Everything was in order—the day had been peaceful. I poured some water into my canteen cup, took my tooth brush and

paste, and, walking a few yards from my dugout, proceeded to fix up the old teeth. I had just looked at my watch—12:03 AM of July 15. As I stood there in the darkness, under a tree, listening to our artillery banging away, there came a shrill whine, whiz—bang!

I jumped. That was close. Damn our artillery anyway! They've started an argument now that may get disagreeable, and my company will be among the innocent bystanders! This thought took but a moment—and in that moment the Boche cut loose with everything he had and right at me! I ran—yes I did—I ran back to my dugout, my gas mask, my helmet! What was up? 1st Sergeant Watson slid in the door—a startled look on his face—a question, and—in popped a runner whose post was near my command post but who had no cover—then came my lieutenant from the nearest guns—and next, Supply Sergeant Deady. Quite a crowd in my little dugout—all of them wondering what to do.

There was nothing to do. Shells of every size were falling all around us. They seemed to be coming from three directions—and thickly, too thickly. Obviously it was silly to try to move about right now. Surely no Germans could be through the front lines so soon. Was it a big raid or just a real bad artillery straffing? Was it the "Big Attack?"

The phone went out almost immediately—so we sat wondering. We put out the candle. Why, I don't know, inexperience, I guess, for its tiny light couldn't possibly shine through the dugout to the outside.

Soon we smelled gas. The men in the dugout with me had no gas masks. They had forgotten them in the excitement and haste to get to the company commander to find out what was happening.

I peeped out of the dugout door—black as pitch—flashes of bursting shells—crashes of metal hurtling into the wood—trees falling—confusion. A sense of terrific havoc and power close at hand. I couldn't see things clearly—a flash—then succeeding blindness. An ammunition dump near us started popping off. The noise and confusion doubled. Sergeant Deady and I decided to dash

to his small supply cache and grab some gas masks. We started together but in a moment we were separated. The path was obstructed by fallen trees—we ducked shells individually—or thought we did. I couldn't locate Deady or the masks. I imagined him killed and that unnerved me a bit. I hunted frantically—then I heard a shout—"I've got 'em Capt"—and back we dashed to the dugout.

We put on the masks—and sat around the dugout gazing lugubriously at each other. No talking—no cigarettes. The din kept up—it had lasted hours. We couldn't hear anything but explosion after explosion.

The blanketed doorway bulged aside and Private Calnan from battalion headquarters fell in among us. "This is hell!" he said, and handed me a field message. I thought: "We're going to do something—I wonder what." I opened the message. It read, "The ammunition dump will remain at Bochage Farm." I looked at Calnan, clothes torn, blood flowing from a wound in his thigh, gasping for breath. This was my first experience in seeing a man's life risked to send a useless message. I'm afraid I swore a bit. I took off my gas mask—a bit fearfully—to ask:

"Why aren't you wearing your gas mask?"

"Had to take it off to see where I was going—couldn't breathe with it on anyway."

We continued to sit. I kept Private Calnan with me. He seemed to be doing all right without a mask and was calmly smoking a cigarette. So I took mine off. Thus we learned the difference between high explosive gas and real gas. Good old Experience! The smaller shells began to fall in fewer thousands—but we heard some awful explosions forward—gigantic things. A minute or so and they came nearer. The ground shook around us. Another! The interval was regular—the approach definite—would they reach us? We felt helpless—deserted—abandoned. Just sitting—waiting—wondering—the hardest thing in war to do. Not a rifle shot or machine gun burst could be heard. Were my guns firing a barrage? Were they working at all? I didn't know—it was sheer folly to

try to find out. Had there been a target, we couldn't have seen it.

A terrific roar, explosion—concussion!—trees crashed—the candle went out—the lieutenant and I, sitting on my cot, were jarred clear of the ground. And at that moment came a shriek and a thud against our very dugout. Then a horrible silence. Maybe it was I who yelled, maybe it was someone else. But nothing happened. Were we to be destroyed like this? Doing nothing, not even seeing? More hours passed.

Through the doorway I saw a dim light. Dawn was breaking. Those terrible concussions continued. I decided now that we could see, we'd dash to a big dugout near by—one that had been intended as an alternate command post for the 7th Infantry. Anyway, I knew it was not yet occupied. I climbed out of the dugout and gazed at the havoc. The woods looked as if a hurricane had struck them—trees were down—debris everywhere—paths obstructed with bodies of men and horses. And a dud was embedded in the top of my dugout!

I told my company headquarters, and the lieutenant of the rear guns to follow me—and I led a hundred-yard dash in nothing flat to that new dugout. Panting, we slid down into it. Thank God! Reasonable security at last—and lots of room. The bombardment continued, but we breathed easier—even joked. All at once shells began to skip across the top of our dugout—"Owish!"—the blankets flopped, the candle wouldn't stay lit.

Gradually the shelling near us let up, but we could hear a heavy bombardment forward. From where we were I could see that the shells were now falling on certain areas—with only scattered fire at other places. It was time to get out and see what it was all about—check on my guns—see what I could do.

Never shall I forget that inspection—my first contact with actual war. The ground was torn up; trees wildly twisted and broken; the smell of gas permeated everything; scarcely a bit of ground the size of a parlor rug that had no shell hole or scar upon it—craters from 75's, 105's, 210's, 320's. And in the roads, in the ditches, in

the woods, were dead men, dead animals, shattered wagons, mutilated equipment of all descriptions. There were wounded and dying—there were soldiers with staring eyes, trembling behind whatever cover they had been able to find, but apparently not wounded. There were stragglers—some silent, some hysterical, some swearing, some trying to find their outfits. There were bursted carcasses of animals. There were dead men turned blue, with crinkled hair, distorted features—gassed. Near a vast crater stood an ambulance—the horses dead, the driver dead—the occupants dead—two medical corps men shoving a wounded man on a stretcher into the wagon—all dead—stiff—statesque—killed by concussion. It was horrible! The 7th Infantry had been caught in the midst of a relief between front and support lines. Stark horror! Shells still fell. Men were running around trying to find their companies, officers trying to reassemble their commands—no one knew what was happening up front—but by now we knew it wasn't "just a raid".

My guns were all right—but some animals had been killed and wounded, carts damaged, the rolling kitchen hit, and five privates were dead, fourteen wounded. Shelling made it difficult to get about—to get new equipment—to move anyone.

Having learned how my outfit was, but nothing of the situation in front of them—I proceeded to the 7th Infantry command post to obtain information. Maybe there'd be some work to be done, if not with my own guns, then the attached four guns from Company C. I could move them to some point where they might be needed—for by now the enemy must have committed himself definitely and the direction of attack would be known.

Down into the cellar of La Rocq Farm I stumbled. It was about 5:30 or 6:00 o'clock—I'll never be sure of the hour. I found a busy, busy command post. There were runners, officers, a French 2d Lieutenant banging on a typewriter, oblivious of everything—but all were tense, drawn. The Colonel was pacing the floor—hands behind his back. I reported to him—asked for information. More

vital problems were bothering him—I seemed not to exist. Someone gave me vague tales of fighting down in front, of Germans infiltrating here and there, the front line holding desperately, an expected German attack from the right flank.

I asked if I could do anything—put the four mobile guns of Company C on the threatened right flank? That suggestion seemed a good idea.

Then I was ordered by an excited field officer to carry a message to the reserve battalion, "as these damn runners didn't seem to know where to go—didn't want to know." I was not smart enough to dodge that request, so I carried it out, ducking shells for another hour.

When I got back I was told to "stay here". Since I had guns to watch, that didn't seem reasonable. Also, I hadn't learned anything yet—and maybe I'd become an unwilling messenger again. So I left a runner there and stole out.

I went off to the right and rear of the 7th Infantry support positions—if an attack came I wanted to have positions in mind beforehand. Nearby was a battery of the 10th Field Artillery. I located the lieutenant in charge and asked him what he knew. "Nothing", said he, "except there are some Boche along the river front about 4500 yards away and I'm going to blow them out". And I believe he and his colleagues did.

There wasn't much aerial activity, but what there was, was German! They flew about, with no opposition, spotting command posts, batteries, troops. We didn't cherish that a little bit.

I went back to my company. Nothing had happened—it was still there—just as much at sea as I was.

Confusion was still rampant—everyone in command got excited over little details—believed almost every report or rumor that came in—and they came in plenty! I was killed at least three times.

A runner came dashing in from the 7th Infantry command post. "Five hundred Germans are advancing through Fossoy—the reserve battalion is going to attack them at once—your spare guns are to go along. Report to C.O.

7th Infantry at once." The runner wasn't sure whether it was 500 or 5000 Germans. He said he had been looking all over for me. I asked why my own runner hadn't been sent. He didn't know.

When I got to the command post the Colonel had gone somewhere. The counterattack was said to have started but no one there knew what I was supposed to do. I tried to find out where I could locate the battalion commander of the attacking battalion and report to him. That didn't work either—I was sent the wrong way, and by that time it was too late. Meanwhile the battalion had run into some heavy fire of interdiction in a woods—got mixed up—out of control and suffered many casualties. There weren't 500 or 5000, or even 50 Germans in Fossoy! It was all *excitment—exaggeration—nerves!*

By late afternoon everyone, more or less, had his sea legs—order was coming out of excitability and needless hurry and scurry. We didn't believe everything we heard now. So far my organization had seen no targets to shoot at—received no specific orders—made no move—just hugged the ground.

No one looked forward to nightfall. Things were pretty much disorganized. Shelters had been demolished; some troops were in entirely new positions with no trenches or dugouts; communication was still bad. With darkness would come the unseen, the unknown—which, to the nerve-torn and nerve-tired men, meant fear. Through the ages, the unseen and the unknown have always meant fear. Would the Germans bombard us again? Would they attack? Where? How far had they gone today in our own sector? How far on our right and left? We had heard that the French had fallen back on our right, that if it hadn't been for the Divisional Labor Battalion the 38th Infantry might have been thrown back in disaster. No one in the subordinate units knew how things stood.

The night, though sleepless, was uneventful for us. We had not yet learned to sleep whenever opportunity was offered. Of course, there was desultory shelling all night long.

The next day found no change in my sector—all original lines were occupied. People were regaining their calm and their sense of proportion. Useless speed, useless action was less in evidence. There was reassurance in the news that a fresh French division was in our right rear, preparing to counterattack in the area to the right of the 38th Infantry.

The platoon from Company C was taken away from me. Since this meant going into reserve farther back, it wasn't sorry to leave. If the truth were known, we were a bit envious, although, so far, we had been only spectators!

That day passed by quickly without action on our part. I steered clear of all excitable command posts and got some sleep.

By evening it was the general opinion that the German attack had failed, their advance elements across the Marne falling back, and there was talk of our following them up. But there was also concern over the possibility that the Germans might make one more desperate effort; if they did, it would probably be that night.

Starlight found every one alerted. The comparative quiet, in itself unusual, enabled us to hear occasional bursts of fire along the river. The least movement apparently invited an investigative shot. This shot started someone else, which alarmed someone else, and soon the entire line was blazing away. Then a flare would go up and the artillery would join in the fun. Just as suddenly and unreasonably as it began, everything would stop and there would be quiet once more. This happened often before we became seasoned troops.

My own guns got mixed up in one of these dog fights. About three in the morning (17th of July) somebody thought there was another German division down in front of the 7th Infantry, and promptly set off a barrage flare. There had been no heavy firing, no artillery accompaniment, but the lieutenant at the barrage battery let her go. I went hustling over to see what it was all about, but I saw nothing, and heard nothing. Anyhow, the guns looked pretty and sounded fine. We felt we were annihilating thousands; probably all we did was kick up a

lot of dust around Gland inconveniencing a few Boche. Just the same, an infantry officer down in front of us told me later that it sounded good to hear a friendly barrage of machine-gun fire going over his head. It made his men feel that someone was back of them. So I guess it was worth the 4800 rounds after all.

We did some harassing fire by day and by night on the 17th and 18th. By this time we knew definitely that the Germans were pulling out so we peppered small woods, roads, and similar areas that we imagined the enemy might be using.

On the 18th we learned of the counteroffensive at Soissons and of our imminent move across the river to help clear out the "Marne Pocket". Our part in the third Grand Offensive was over. Through it all we had seen no Germans, nor had we picked up targets of any kind. We hadn't even maneuvered. Nevertheless, we had become veterans—by participation, yes, but mostly by active observation.

We had experienced thrill, confusion, tenseness, expectancy, fear, nerves, exaggeration—the unknown quantities as well as the reality of war. We had gained some of the calm, the judgment, and the sense of essentials and proportion that everyone must attain, in his first action under fire before he can begin to call himself a veteran.

CONCLUSIONS

I. In our training there is good reason for seriousness, thoroughness, repetition, and insistence upon fundamentals. We must know the characteristics and limitations of our weapons.

II. In preparing for action observe the following points: be calm; know what is happening; know why it is happening; know the part you are to play and how you are to cooperate with others; eliminate the unnecessary; make thorough *inspections* and *reconnaissance.*

III. In action avoid exaggeration and probe all rumors. Be definite and specific; above all keep your head and use horse sense. Remember that excitement and haste result in waste, confusion, and loss of control. Don't send unnecessary messages or issue unnecessary orders.

One of the most essential things is the transmission of accurate and up-to-the-minute information to the proper authority.

IV. Machine guns and artillery form the mainstay of defense. I doubt if twenty per cent of the 3d Division saw infantry action. It was the artillery and the machine guns that held the Marne on July 14-15, 1918.

CHAPTER X

Operations of the Supply Section, 2d Battalion 306th Infantry on the Vesle River

A SUPPLY PHASE OF COMBAT

PERSONAL EXPERIENCE MONOGRAPH OF CAPTAIN HENRY E. KELLEY, INFANTRY

The following account of the operations of the Supply Section, 2d Battalion, 306th Infantry (77th Division), covering the period August 15 to 17, 1918, attempts to show in small part how the wheels turn behind the line in answer to that plaintive query: "When do we eat?"

The sternly resisting German had by August 4th retired to a strong defensive position on the heights north of the Vesle River. From these positions, aided by perfectly registered artillery, unlimited ammunition and complete control of the air, he stopped the rapid advance of the Americans and French along a line roughly following the south bank of the Vesle opposite Bazoches. (See map opposite this page.)

From the 5th to the 10th of August, the 4th U. S. Division, with the 28th U.S. Division on its right, and the 62d French Division on its left, attempted in a series of desperate attacks to cross the valley of the Vesle and gain a foothold on the northern heights. Only dearly purchased local gains resulted and by August 10th it was apparent that there would have to be a halt to permit reorganization for a coordinated attack. On this date it was determined to relieve the sorely tried 4th Division with the 77th Division.

At this time, the 77th Division, which had recently been relieved from the comparative comfort of a quiet Lorraine sector and rushed to this front by rail and marches through mud and rain, was located near Coulommiers, about forty miles south of the 4th Division front.

On August 10th, the combat elements of the 153d Brigade, 77th Division moved from Coulommiers to the front by truck, leaving the animal-drawn supply trains to follow with all speed possible.

At 8:00 PM, August 11th, the 153d Brigade of the 77th Division commenced the relief of the 4th Division. Because of heavy shelling, gas, bombing, and the confusion of lost columns and missing guides, however, it was not until daylight, August 12th, that the relief was completed.

Let us leave the troops crouching in their fox holes along the south bank of the Vesle River, tormented by thirst under the burning heat of mid-August, while hordes of loathsome flies fought for the last of their rations, and see what has become of the organization that was supposed to feed and supply them.

March of the Trains

Upon departure from Coulommiers, the field and combat trains of the 306th Infantry, 77th Division, reverted to the control of the regimental supply officer and began their march forward as part of the brigade train. Crowded upon a single road with the divisional artillery as well as the trains of the 154th Brigade, fifteen to eighteen hours a day were spent in draft. They progressed at a rate of little over a mile an hour. Marching by day as well as by night, the trains of the 306th Infantry reached their bivouac in the northeast edge of the Bois de la Port d'Arcy at 10:00 AM August 14th, almost five days later.

The regimental supply officer and the munitions officer immediately went forward to report to the regimental commander at the Ferme des Dames, leaving the battalion supply officers engaged in the supervision of the routine duties of the camp.

Organization Supply Company, 306th Infantry

While they are gone, let us glance at the organization of the Supply Company, 306th Infantry. Its company commander, in addition to commanding the Supply Com-

pany, functioned as the regimental supply officer. The company was divided into three groups: namely, Company Headquarters, Combat Train, and Field Train.

The combat train was under the command of the munitions officer. In practice this officer handled his train as a separate command, reporting directly to the regimental commander and reverting only to the supply company for supply and administration. Thus, the battalion commanders seldom exercised any direct control over their combat trains, merely receiving notice from time to time that ammunition dumps had been established for them at certain places.

The supply train was divided into three battalion sections, each of which was composed of the following personnel and vehicles:

1 lieutenant (battalion supply officer)
1 sergeant (transport)
12 drivers
4 kitchens
4 ration carts
4 water carts.

At this time ration and water carts were mule-drawn and kitchens were horse-drawn. Each battalion section was also accompanied by the battalion rear echelon, consisting of the company supply and mess sergeants and cooks.

Comment

The weakness of this organization was the dual control exercised over the battalion supply officers. The battalion commanders looked upon these hapless lieutenants as members of their staff, while the regimental supply officer considered them as company officers. This resulted in much confusion, not the least of which was the conflict of policies laid down for the guidance of the battalion supply officer. The battalion commander, naturally concerned with the welfare of his men, directed that the rations be brought forward to the farthest point possible, whereas the supply officer with equal force threatened dire results if due caution were not exercised to prevent

casualties among the animals. This condition was corrected later by the detailing of another officer to the staff of each battalion as supply officer. Its influence upon operations of the following day can readily be seen.

Operation To Include 6:00 AM, August 15

About 3:00 PM August 14th, the supply officer returned and, assembling his lieutenants around his map, outlined the situation to them in substance as follows:

"From the heights north of Bazoches the German artillery dominates the sector. Enemy control of the air is complete and their planes are active both day and night. We relieved the 4th Division and part of the French 62d Division. Our regiment is along the south bank of the river, its left in contact with the French northwest of Mont Notre Dame. The 305th Infantry with two battalions in the front line is on the right; our regiment, with one battalion in the front line and the other two echeloned to the rear, is on the left. Losses have been heavy, water is scarce, and the men are out of food."

To the lieutenant commanding the supply section of the 2d Battalion, he gave the following order:

"The 2d Battalion is in the front line along the railroad north of Mont Notre Dame. You will take the kitchen section and rations to Mont Notre Dame and report to the battalion commander. It's a bad place. Watch out for gas. Better consult with the Supply Officer 1st Battalion as to your route. No movement from this position until dark."

The recommendation "to consult with the Supply Officer, 1st Battalion," was probably made because of the inexperience of the 2d Battalion Supply Officer. Recently transferred from a line company, he was now to have his first experience in taking a train forward.

The order was completed about 4:00 PM and, although at least four hours remained before a forward move would be advisable, the 2d Battalion Supply Officer attempted no reconnaissance of his route. In fact, it never even occurred to him that such a reconnaissance was advisable.

He contented himself with a map reconnaissance. Let us see what he observed.

About a mile in width, the valley of the Vesle runs generally east and west. North of Bazoches, the northern slope rises abruptly. These heights command almost everywhere the more gradually rising southern slopes and the lateral Mareuil en Dole—Chery Chartreuve Road. Three roads approaching Mont Notre Dame appear on the map, the Loupeigne—Lhuys road to the west of the railroad, and the two roads running northwest from Chery Chartreuve. These two roads are both rather exposed. To use either involves considerable movement across the front of the position as well as passage through Chery Chartreuve, which is under constant shell fire. The Loupeigne—Lhuys road appeared to be a more direct route and to afford considerable cover, although passing through the sector of the 62d French Division on the left. Several farm trails cut across the area in various directions. To use these, however, without careful reconnaissance was out of the question.

It was therefore decided to use the western approach. The lieutenant assembled the supply and mess sergeants of the battalion with his transport sergeants and issued instructions as follows:

"We move out after dark. Everything will be loaded ready to move at 7:45 PM. Stew and coffee previously prepared will be carried on kitchens, the balance of the rations on the carts. E and G Company water carts will go loaded and double teamed."

The supply officer then carefully went over his route on the map with his transport sergeant and by 5:00 PM was content to sit down to an excellent meal, well satisfied with his preparations.

At dusk the train assembled under cover. Eight enemy balloons were still up, but the road running east through Mareuil en Dole to Chery Chartreuve was already noisy with traffic. At this time the sergeant in charge of the transport of the machine-gun company supporting the battalion reported to the supply officer, requesting per-

mission to attach his transport to the battalion train which was reluctantly given. At 8:00 PM the train moved out with the ration carts leading and the kitchens, water carts, and machine-gun carts following in the order named.

Between the bivouac and Mareuil en Dole, the column kept well closed up, but as soon as the left turn was made on to the empty road to Loupeigne the column opened out, taking fifteen yards between vehicles. Listening to the rattling train, stretching over 300 yards behind him, the supply officer felt that the clatter must already be audible in the German lines. The transport sergeant had taken position behind the last water cart; the machine-gun noncommissioned officer, in rear of his transport. For the first 1500 meters the road protected by high ground to the northeast, was free from enemy fire although constant shelling could be heard to the north. Loupeigne was occupied by French artillery whose positions appeared to be northeast of the town. The French artillerymen came down to the road commenting most unfavorably upon the presence of the train. Occasional shells could now be heard ahead. Consequently, upon reaching the road junction northwest of Loupeigne, the train was halted.

After a short reconnaissance it was determined that the shells were dropping on the stretch of road just northwest of the railroad (Area 1). Three shells were then timed and the interval was found to be constant—one shell every two minutes. As it was found to be impracticable to detour is was decided to send the train across the shelled area in rushes.

The following plan was adopted by the supply officer for taking the train across the shelled area. The vehicles were first to be taken to the shelter of the cut just south of the railroad underpass in small groups of three to five, according to the type. At the underpass they were to wait until a shell burst, whereupon they were to move at the gallop through the area and halt for reorganization at some point beyond. The supply officer himself would take the first group of five carts across. Thereupon he

would attend to the reorganization of all groups as they arrived. The transport sergeant would remain with the train and send the remaining groups forward to the underpass at the proper time.

As the five ration carts took the gallop, it was apparent that it was hopeless to attempt to maintain any distance between carts. Both drivers and animals were anxious to go and in a few yards all were tightly bunched. In fact, the next rush by the leading kitchens was quite comparable to a chariot race.

The leading vehicles were halted a short distance beyond the shelled area under the slight cover of a bank in order to allow the column to close up and to quiet the animals, which, excited by the noise as well as the run, were giving trouble.

It was now noticed that the stretch of road just beyond the bend was also under fire. Investigation indicated that the road from the stream crossing to include the crossroads was the target (Area No 2). The rate of fire appeared slower and more irregular than in the first instance.

After consideration it was decided to begin a second series of rushes through this area. In the hope of holding the gait down to a more orderly rate, the supply officer decided to remain at the road bend and send the rushes forward. One of the supply sergeants was placed on the leading cart with instructions to collect the transport again in the first good cover beyond the shelled area.

Both areas were eventually passed without loss and the transport reformed about a kilometer south of Lhuys. The attempt to hold down the gait had not proved a success and the difficulty of controlling the animals was increasing. The off mules on the ration carts, unhampered by shafts, especially gave trouble. The company supply sergeants were having considerable opportunity to become acquainted with the animals and it is doubtful which stands out more keenly in their recollection of the evening, mules or shell fire.

The road through Lhuys was relatively safe. It snug-

gled closely under cover of Hill 120 and even beyond Lhuys it had considerable cover afforded by the steep high bank along its west side. The verbal disapproval of our French allies was again received in Lhuys. Several of the Frenchmen came out into the road and, pointing in the direction of the train's destination, remarked: "Pas bon sector".

Shortly afterwards, the reason for this cheerful remark became obvious, for, as the transport approached the point where the road left the shelter of Hill 120 to turn sharply eastward to recross the little valley of the Muze, it could be seen that the approach to Mont Notre Dame was interdicted. Shells were falling upon the exposed stretch of road from the stream crossing to include the railroad (Area No 3) at the rate of two per minute with an occasional salvo of four. These shells appeared to be lighter in caliber than those previously encountered.

The train was halted in the secure protection of the bank on the southeast slope of hill 120. Little reconnaissance was required as it was obvious that the bottle neck across the narrow valley, was, for the present at least, tightly corked. There was marsh on both sides of the road, and the railroad which the road again underpassed, was steeply banked. No alternate approach was available without retracing the route almost to the starting point; consequently it was decided to wait for a cessation in the fire.

Shortly after this decision had been made a motorcycle came speeding out of Mont Notre Dame across the valley. The motorcycle was stopped and the driver proved to be a messenger on his way to the regimental command post. At the earnest request of the supply officer the driver agreed to take him into Mont Notre Dame although he emphasized the fact he was in haste and could not delay long.

Leaving the train in charge of the transport sergeant who was told to wait his return, the supply officer riding in the sidecar entered Mont Notre Dame without incident. At the command post, the supply officer found one of the battalion staff and a lieutenant of the machine-gun com-

pany. The battalion commander was forward with his troops. Conditions were bad; several gas concentrations had already been placed on the town and most of the troops had withdrawn from it. Hasty arrangements were made for a guide to meet the transport at the southern entrance and for carrying parties to take care of the rations. The supply officer left with the understanding that the train would enter as soon as conditions permitted.

Shortly after the supply officer rejoined the train the rate of fire suddenly increased to thirty shells a minute, chiefly gas. A ration cart was struck and the wounded driver taken back to the French dressing station at Lhuys. The animals were still very nervous and the masks made it difficult for the drivers to handle them.

Shortly after 2:00 AM the fire died down and, although the low ground was still drenched with mustard gas, it was decided to take the ration carts forward leaving the balance of the train behind.

No guides were found at the southern entrance to the town, so the supply officer left the carts there and rode forward to the command post. Here he found only a single soldier remaining. Both officers had been gassed and removed from town. The command post had also been moved and the soldier remaining could give little information as to the new location.

To the supply officer the situation had now become most serious. It was almost 3:00 AM. Less than three hours remained before daylight. It was certain that the German balloons would be up at daylight. For the transport to be caught on the road at that time would be disastrous. He knew how badly the troops needed the food. On the other hand, he had been given explicit instructions not to hazard the loss of the transportation. Should he leave his transportation where it was and make a further reconnaissance to locate the battalion or should he dump the rations where he was and start back without delay? He decided on the latter course.

Returning to the carts, the supply officer had the rations dumped at the road junction just southwest of

Mont Notre Dame and told the company supply sergeants to locate their companies and obtain carrying parties. Having disposed of the rations, he directed the carts back one at a time to rejoin the train.

Just as everything was ready for the return journey, the sergeant in charge of the machine-gun carts asked what he was to do with his carts. This was a hard point to decide, but in view of the uncertainty of the tactical situation and the location of the machine-gun company at this time he directed that the carts remain with the train.

The transport returned over the same route pleasantly surprised by the lack of shelling. As they passed through the area of the French division, the supply officer noted that the train movements had not begun until later in the evening and that the road, quite empty during the trip forward, was now crowded with returning transport. It was not until some time later that the supply officer learned the reason for this. It lay in the fact that the German artillerymen in this sector, being human like every one else, enjoyed a little sleep and, after firing the night's quota of harassing shells, knocked off about midnight each night and went to bed.

The bivouac area was reached shortly before 5:00 AM. Nearly nine hours had been consumed on a round trip of less than twelve miles. Little did the supply officer dream as he turned in for an hour's sleep that his night's work had been largely futile in that much of the ration delivered had been rendered unfit for use by the gas.

Comments

This night's experience provides an excellent example of how a routine operation of this type should not be carried out. The supply officer's lack of knowledge of the situation and route, which had been the cause of the major part of the difficulties, was due to his failure to use three separate opportunities for reconnaissance. If the supply officer had accompanied his battalion when it entrucked at Coulommiers, he would have had at least two days to familiarize himself with routes and conditions. Failing this, he should certainly have been re-

leased immediately upon the arrival at the bivouac. Both of these errors could still have been retrieved if the supply officer had made proper use of the time remaining after the receipt of orders from the regimental supply officer. If he had reconnoitered his route at that time and reported to his battalion commander for instructions, much wasted effort would have been prevented. In his selection of the more covered route, he failed to take into consideration that this very fact rendered it more dangerous and more subject to interdiction at its many sensitive points.

His failure to protect the rations from the effects of gas, both while en route and after establishing the dump was inexcusable, particularly in view of the warning contained in the orders he received. However, this, as well as his unauthorized use of forward roads in the area of another division, can properly be accredited to his inexperience.

The failure on the part of the battalion to make any effort to meet the transport was, of course, due to the pressure of the situation. This is further evidence of the need of having someone, charged solely with the problems of supply, up forward where he can be conversant with the tactical situation and maintain contact with the supply elements.

The withdrawal of the machine-gun transport after it was safely forward was an error. If these carts had been left in one of the ravines well south of Mont Notre Dame, they would have been in a better position to assist in the move of the battalion on the following night.

Operations to Include 12 Noon August 16

On the next day (August 15th) while the transport lines were busy with the routine of a new day, the regimental supply officer again went forward to the regimental command post. With him went the supply officer of the 2d Battalion. The other battalions had received their rations without incident on the preceding night. This explains why the regimental supply officer was accompanied only by our friend, the 2d Battalion Supply Officer.

Upon arrival at the command post the extent of the damage of the preceding night became known. The enemy, in drenching the low ground of the front lines with gas, had caused casualties so heavy that among other changes, the 2d Battalion was forced to move its forward elements back from the low ground of the river valley to a general line running roughly east and west through Cote 140.

Orders were received that the battalion commander of the 2d Battalion desired his kitchens brought forward that night into the Bois de Dole to a point about a kilometer west of Ferme des Dames.

With ample time available, the now cautious battalion supply officer made a careful reconnaissance of available routes. Although many cross-country trails were available, he decided to avoid them because he thought the heavy, unwieldy kitchens could not possibly be driven through their deep sand. He chose a route that had been successfully used by the transport of the 1st Battalion on the preceding night. This route followed the lateral road through Mareuil en Dole to Chery Chartreuve, thence doubling back over a good unimproved road running past Ferme des Dames to destination.

This was a trip of just under six miles. The road was under casual shell fire practically throughout and was being systematically harassed both at the road junctions in Chery Chartreuve and at the crossroad on the northeast slope of hill 200. The supply officer found that at Chery Chartreuve he could probably avoid some of this fire by turning off the main road just short of the road junction. In addition to making this personal reconnaissance, he also discussed the route with the supply officer of the 1st Battalion.

The mess sergeants were notified to make the same preparations they had made on the preceding night and the train was ordered to be ready to move forward at 8:30 PM.

As the train moved out, the volume of traffic on the Mareuil en Dole—Chery Chartreuve road was found to be even greater than on the preceding night. An artil-

lery brigade relief was in progress. The artillery of the 4th Division, which had been supporting the 77th Division, was being replaced by the divisional artillery. With some difficulty the train was able to slip into a short gap on the traffic-jammed road and thus begin its journey.

In spite of rigid supervision by the military police, movement was incredibly slow. Frequently traffic was almost at a standstill; a move of a hundred yards or so would be followed by a fifteen-minute halt. This continued on through the night. Units and vehicles gradually closed up almost without distance. Horsedrawn artillery units were moving both ways, interspersed with motorized trains.

About 10:00 PM the familiar drone of enemy planes announced that a welcome to our artillery was about to begin. Back and forth throughout the night, as fast as the planes could take on a new load of bombs, they traversed the road. At intervals, a fear-maddened team crashed through the double lanes of traffic, injuring men and starting secondary panics among the animals. Special details promptly pushed wrecked vehicles off the road. Through all this confusion could be heard the sound of the enemy shells pounding the Chartreuve corners. The increasing clearness of this sound as the night wore on was the only indication that the column was actually moving forward.

Much better progress was made after passing Chery-Chartreuve, but day was breaking as the transport passed the regimental command post at Ferme des Dames and enemy balloons were going up as the train entered the Bois de Dole at a gallop. There, the kitchens were spotted in the woods south of the road and their teams picketed nearby to remain available for any sudden move.

At 9:00 AM the train, now composed of empty ration carts only, began its return trip, using the trails through the woods. In less than an hour and a half it was back at the transport lines having completed a movement that had taken ten hours to accomplish during the night.

Comments

No information of the prospective artillery relief had filtered down from higher headquarters to the supply officer. However, even if this had been known in advance, it is doubtful whether a cross-country move with the heavy cumbersome kitchens would have been attempted. Even the short move of the kitchens over a wood trail when they went into their position in the Bois de Dole required doubling of teams and pushing through the deeper sand pits by hand.

This almost incredibly slow progress on the main road indicates what may be expected when it becomes necessary to pass masses of transportation through highly accurate shell fire. The delay at the Chery Chartreuve was felt for miles back along the roads.

Therefore, the lesson of outstanding importance to be derived from this night of tedious routine is the great limitation of the mobility and tactical employment of battalion trains caused by the use of vehicles so heavy that they are practically confined in their movements to main roads. In contrast to this was the relatively unlimited freedom afforded the empty carts when operating alone across country on the return trip.

In the above situation, the motorized trains of the division were blocked for hours amidst the slower animal transport—the whole providing a perfect target for the alert enemy. On a densely traveled road the traffic takes the rate of the slowest vehicle. It is useless to motorize trains if the animal transport is not sufficiently mobile to clear main roads for their use.

Operations to Include 12:00 PM, August 17

Before complete darkness had fallen on the next night (August 16th), the loaded ration carts slipped out over the cross-country trails, bent on getting a jump on the enemy firing schedule. The route followed was northeast to the trail junction 800 yards northwest of Mottin Ferme; thence northeast to the trail junction at the western edge Bois de Dole, south of Hill 160; thence to destination.

While en route the carts avoided the fire of two enemy batteries in action against this area so well that not even a single shell dropped near the little train. In less than an hour and a half the three and a half miles had been covered. Upon arrival it was learned that because of shell fire attracted by the smoke the kitchens of the battalion had, with difficulty, moved to a location southwest of Cote 185, about a kilometer and a half to the south. This position was also reached without great difficulty by using trails through the woods.

The return trip was completed with equal smoothness. Only a couple of wandering shells searching for our batteries disturbed the placid course of the trip. The route used was the Mottin Ferme—B Mottin trail. For the first time in a week the mules were tucked in by midnight for a well-earned night's sleep.

Comment

The advantage of operating across country, even if exposed to enemy artillery fire, is clearly shown by this third night's operation. Movement across country affords great freedom for maneuvering to avoid shelled areas as compared to movement on roads where the enemy can maintain accurate fixed fire on areas through which the transportation must pass.

While the account of this operation properly ends with events of the third night's operation, it is believed the following incidents that occurred later in the operation are of sufficient value to mention in passing.

Concealment of kitchens, in a sector such as this where the enemy was not only strong in artillery but that artillery extremely accurate with well registered fire, is a most difficult problem. Smoke from the kitchens is hard to hide, especially when green wood has to be used. In one instance the division commander found a reserve company congregated around their kitchen. This is a habit typical of inexperienced troops and one which must be guarded against by the officers concerned.

In seeking cover for its kitchens, one battalion put them in the bottom of a wide and relatively shallow draw

that did not have sufficient defilade to give actual protection. These kitchens received direct hits from artillery fire. It is believed that the placing of these kitchens in the draw put them on the exact target of previously registered enemy artillery, and that in such cases it is better to place the kitchens well up on the slope rather than in the bottom of the ravine.

In many instances the field ration issued to troops was found to be unsuitable. In one instance, when the 2d Battalion was in an exposed position where cooking was impossible, a field ration of fresh beef and artichokes was delivered. These rations could not be prepared for food and they simply rotted. On the other hand, the use of salmon as the main component of the reserve ration was almost equally objectionable. The constant use of this thirst-provoking food during the heat of August was, it is believed, the cause of additional casualties. The casualties occured both through the unnecessary exposure of the men in their efforts to get water and the drinking of unpotable water.

Conclusions

The following conclusions are based chiefly on the experiences of the three nights just described. However, they were fully supported during the following month in this same sector and an additional six weeks of operation in the Argonne Forest:

1. The necessity for reconnaissance and knowledge of the situation requires the presence of both the battalion supply officer and the company supply sergeant in the forward echelon of their units.

2. The difficulty experienced in controlling animals driven in harness, while under shell fire, indicates the need for limbered vehicles with mounted drivers. Infantry transport goes well forward of artillery positions; yet artillery requires limbered transport. In further support of this conclusion, the fact can be cited that one limbered car, retained by the 306th Infantry as a souvenir of service with the British, was constantly used to deliver rations to exposed areas and was very well liked by the drivers.

3. All the transport of an infantry battalion should be sufficiently mobile to move as freely as artillery across country. If the horse and motor transport of a division is to be confined to the use of roads, the danger of loss is greatly increased for both. The danger to the motorized train increases in direct ratio to the curtailment of its speed by being held up amidst the horse transport.

4. If animal transportation must be used for these purposes in the future, a two cart limber similar to that used by the British, drawn by four horses with mounted drivers, would furnish a battalion vehicle meeting most of the preceding requirements. Such a vehicle should be adopted. The forward limber could be built for use as a ration cart and the rear limber could contain a cooking outfit similar to our field range. Under conditions requiring extreme mobility the rear half could be detached to leave an extremely mobile cart capable of going anywhere wheeled transportation can go.

5. Modern war conditions require that either the ration itself be issued in gas-proof containers, or the ration cart be made gas-proof.

6. Although the field ration as issued is highly desirable, it cannot always be supplied. Frequently when it is supplied it is wasted by reason of tactical conditions or spoilage due to excess issue. Therefore, either the reserve ration should be modified so that it remains suitable and palatable enough for use over relatively long periods, or an intermediate type ration, midway between the two present types, should be developed for use under certain circumstances.

7. As a consideration in planning for furture needs, let us visualize how these routine supply operations would have been simplified had there been available the modern motorized equipment which we have today.

The problem of preliminary reconnaissance would have been solved with little difficult by use of a fast reconnaissance car or motorcycle.

There would have been no problem of panic stricken and unmanageable animals.

The traffic problem resulting from delays caused by

mixing animal-drawn and motor transportation would have been eliminated.

Even the antiquated types of motor transportation available then would have been able to accomplish the movements of the first two nights and possibly those of the third. There is no doubt that the modern cross-country vehicles with auxilliary appliances, which we now have, would have gone everywhere and accomplished with much less effort the same results that the animal-drawn transport did in the operations herein recounted.